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THE AMERICAN JOURNAL OF ROENTGENOLOGY

Editor, P. M. Hickey, M. D., Detroit
Associate Editor, F. C. Zapffe, M. D., Chicago

VOL. I NEW SERIES, SEPTEMBER, 1914 No. 11

ROENTGEN INTERPRETATION OF INTESTINAL CONDITIONS

By A. JUDSON QUIMBY, M. D., New York City.

In Roentgen examination of the intestinal tract it is essential that both the Roentgenoscopic and Roentgenographic method be employed. There has been much discussion of the dangers to the examiner when using the former method. That this danger exists must be admitted, even with improved protection, but it adds so materially to the accuracy of findings as to be indispensable. Roentgenographic methods will give a greater percentage of failures in intestinal diagnosis than will occur in any findings on other portions of the body, if adhered to alone.

The lack of uniformity in arrangement of intestinal structures, and the wide variations even in the normal types are so great as to lead to the most irrational interpretations even when we employ every method that has been enumerated by our best Roentgenologists, when the attempt is made to adhere to the X-Ray plate in intestinal examinations.

As a matter of economy, diagnosticians are attempting intestinal findings with the Roentgenoscopic method alone, perhaps taking one plate as proof that an examination was made. That the visualization of intestinal structures by opaque salts is alone sufficient to determine conditions is not true, can be easily proven by anyone undertaking this work on a sufficient scale to establish conclusive proof.

While defects, as extensive ulcer of the duodenum, are visible under the fluoroscope, a small ulcer cannot be seen, though we may get repeated plates of a duodenum with evidence of ulcer, and while palpating and inspecting with the fluoroscope no tenderness is found, the intestine may be held in a fixed position by adhesions that will account for any deformity. A terminal ileum may appear normal on a plate, though when manipulated properly will demonstrate an ileal kink. An appendix may be covered by the cecum, and the hand of the examiner will readily displace the cecum sufficiently to render it a very conspicuous object in the fluoroscopic field. Many cases of adhesions of the colon can only be diagnosed by manipulative methods while examining the part.

Much has been said and written concerning intestinal ptosis, and the harm resulting therefrom has been regarded as the cause of many unfortunate conditions, perhaps capable of repair. In my opinion, simple ptosis is without harm and does not interfere with intestinal function, although it may influence the welfare of other viscera. The stomach may lie in the middle of the pelvis, but if the pylorus and duodenum are descending with it, the drainage will be satisfactory and the function still maintained. If incomplete ptosis exists, by which I mean the suspension and fixation of certain sections of the intestinal tract at such a high

level above adjacent portions of the intestine as to produce acute flexures, great harm usually will result.

A determination of the fixation points in the intestines, the amount of obstruction produced, and the secondary organic changes, either of inflammatory or evolutionary development, can best be made by manipulation of the parts while observing them under the fluoroscope now. When these conditions have been so determined, a satisfactory record can only be made on an X-ray plate, and this while maintaining the parts in such a position as to demonstrate the presence of the defect or deformity.

The technique of operators varies greatly, but I wish herein to outline briefly the main points in my own methods as applied to a determination of mechanical deformities and organic changes in the intestines which are made by the X-ray. When examining the intestine the usual stasis test is given, consisting of a bismuth meal in a suitable suspending media consisting of four to six ounces of bismuth subcarbonate, the amount depending on the relative size of the patient. The quantity may appear excessive, but I am convinced that this amount gives a better reading because of the greater density of the shadow and better distribution. As I make a practice of continuing a patient on a normal diet and withdrawing all cathartics and laxatives for a number of days before the examination has begun, the larger amount of bismuth is very apt to be well diluted by recent food, and unless of sufficient quantity, may give a faulty reading.

Cases presented for examination should always be tested while living under normal conditions and partaking of normal diet. By pursuing this practice, we arrive at a conclusion as to the real power of the alimentary canal to do its work; if artificial stimulus of any kind is employed, inaccuracy can only result. It is a well-known fact that a thorough cleansing of the bowels will improve the function of the organ for an indefinite period, and tests under this condition will always lead to a false finding on stasis.

I examine the patient at six hours after the administration of the meal, the engagement being made for five and one-half hours after the meal to allow for delays and preparation. When the findings are near normal, the case is examined at the sixth, eighth, ninth, thirtieth, fifty-fourth and seventy-eighth hour. If there is a marked gastric delay the ninth hour may be changed to the tenth or twelfth, or if there is convincing proof of a pyloric or duodenal stenosis, the last examinations are omitted that day and a second test made at a later date, during which various manipulations are undertaken to determine the completeness of the obstruction. If the gastric delay is marked, a true reading of intestinal delay is difficult for two reasons: First, it prevents determination of actual time consumed in the intestinal progress; second, sections of the intestine will not contain enough bismuth to cast a good shadow; this is especially so in an examination of the terminal ileum.

If it can be avoided, the patient should not be permitted to lie down between the taking of the meal and the eighth hour thereafter, except for the very brief time necessary in the sixth hour examination, for if the delay is due to a kinking of the duodenum, this will be corrected by the upward displacement of the stomach in the horizontal position and the stomach contents will be discharged very rapidly; or a duodenal delay, a result of kinking at the juncture of the duodenum and jejunum will be overlooked, because this deformity will be also corrected and the duodenum permitted to empty.

Should I find evidence of delay in the stomach or duodenum during the stasis test, I do not attempt to determine its exact character until the second meal, but take up each section of the intestine from the lower ileum downward as they fill with sufficient bismuth. The terminal ileum is examined between the sixth and ninth hour after the meal, if it contains sufficient bismuth; otherwise, this portion is also examined after the second meal. When examining the terminal ileum, it should be sufficiently isolated from other ileal coils to give it a clear field, and if this is impossible, we are forced to wait until the other coils of the intestines are empty. In manipulation of the ileum the first act is to push the cecum up, then apply pressure between the cecum and ileum and endeavor to separate them; the terminal ileum is then moved from side to side and its motility determined. At the same time several sections may be manipulated upward and downward; pressure is then applied just above the cecum to force it downward to the position assumed while in the erect position; this will kink the ileum, if an ileal band or contracted mesentery exists close to the ileo-cecal valve. Frequently ileal bands involve the parts adjacent to the pelvic brim; these can be determined by manipulation of the ileum at this point.

A determination of the appendix of necessity is best made when this organ is filled with bismuth, but frequently in a thin subject, we may palpate it when but a small portion of the appendix is visible. The appendix very frequently will not fill while the ileum retains sufficient bismuth to outline it. My experience has taught me that the appendix is most apt to fill after a large enema has been given, and appendices that do not appear during the stasis test are mostly always found twenty-four hours after the administration of the enema to contain a surprising quantity of bismuth; this has enabled me frequently to locate an appendix that would ordinarily escape inspection. The explanation I have for this, is that the organ was filled with feces that prevented the entrance of the bismuth. An enema dislodges this, and permits the entrance of the bismuth that has already been administered by mouth at the same time the enema was given.

Of a large number of cases that are examined for the appendix alone, I never failed to find some portion of it filled with bismuth. One case, which at operation was found to have almost the entire canal obliterated, when inspected by the fluoroscope previous to the operation contained bismuth in about one-half inch of its proximal portion.

The examination of the appendix, cecum and terminal ileum involves careful manipulation, but with a trained hand this can be done in a very few seconds. I am usually able to do this within five seconds, but to be sure, this does not mean that an entire determination is made in this time, but the portion of intestine that is examined at each visit is that part which is best filled, and we need not examine all these sections each time the patient is on the table. The mobility of the cecum is readily determined, unless lodged in the pelvis, but by careful watching over several days, we may make it unnecessary to attempt to dislodge the cecum from the pelvis. My usual practice is to allow sufficient time for the cecum to empty and contract, which will draw it up out of the pelvis, or the administration of an enema may distend the rectum and push it upward. Digital pressure from below may be employed when justifiable, in the endeavor to ascertain whether the cecum may be dislodged or not.

With regard to the determination of the cause of colonic obstruction, manipulation under the fluoroscope during the passage of the bismuth meal is the most valuable procedure; this is superior to manipulation following the administration of an enema, providing the various sections of the colon retain sufficient amounts at the time of the examinations. Ingested bismuth is usually in the more solid state in the colon than the enema, therefore much better manipulation can be followed. Attempts to determine adhesions when the colon is distended by the very fluid enema, in addition to the added rigidity of the abdomen from abdominal distension, render it very deceptive, and should not be given much credit.

Examination for bands, adhesions, and membranes involving the ascending colon, as well as other sections of this portion of

the colon, is done by such manipulative methods as are obviously necessary to separate and move the folds and coils about. Mesenteric bands in many cases are so buried in the wall of the intestine between the haustrations, that we can only find them by deep palpation which will separate these segments. If we find these constricted fixed points, and at the same time observe delay at this place, we are safe in assuming that such conditions exist. Erect position may bring out the acute angle that is formed where the band has fixed the gut, the splenic flexure at deep inspiration may force the colon down so that the angulation is made manifest.

If during the statis test, delay not directly traceable to pyloric obstruction was found, the duodenum is inspected, especially at the juncture of the first and second portion. To do this a meal is administered with the patient in the erect position, then sufficient time is allowed for it to reach the duodenum; it is now watched under the fluoroscope as it passes from the stomach. The conus-duodenalis will fill promptly, especially if gastric peristalsis is active. If the gastric motility is slow, more time is allowed. After the first portion of the duodenum is filled, if none escapes into the second portion or if it passes through excessively slow, the stomach is elevated by moderate pressure just below the greater curvature, and if there is a kink at this place, the tension is relieved by the upward pressure, and progress of the duodenal contents is uninterrupted. The patient is then placed in the prone position, the stomach permitted to drift upward, and the advance of the bismuth through the duodenum watched by the fluoroscope, posteriorly. The patient is then turned to the supine position, first lying on their right side in order to fill the pyloric end of the stomach. The progress through the duodenum is watched for a moment, and the patient is asked to take a deep inspiration; this will force the duodenum downward with the liver, so that the fingers may be pressed in above it, and when the lungs are emptied and the liver is carried upward, the duodenum also will be pulled upward if fixed, whereas if not adherent or retained by a band, it can be easily held down by moderate pressure. At the same time the degree of tenderness may be determined.

Kinking at the duodenal-jejunal juncture may be difficult to find, but by filling the duodenum with pressure upward on the stomach, then rotating the patient to the left, the amount of retention in the duodenum should tell us the degree of obstruction.

If we inspect the intestines in the vertical position, at varying periods and under different conditions, we find marked changes in the degree of ptosis. The factors that enter into this are the quantity and position of the intestinal contents. In general it may be said that the higher in the abdominal level the accumulations are, the greater degree of ptosis. A distended rectum and pelvic sigmoid will push the ileum upward, and under certain conditions, will also carry the cecum up. If the ileum is filled with gas or feces, the transverse colon and stomach are elevated; if a mobile cecum is loaded, it is very apt to be found in the pelvis because of the wedge-shape of this structure, but if empty, will contract and retreat to its normal position. If the cecum is above the brim of the pelvis, and the rectum is distended with feces, a Lane band may not obstruct the terminal ileum, that is, providing this band does not fix the ileum too securely to the posterior wall. If a cecum rests in the pelvis, and there is no obstructing ileal band, even with a patulous ileo-cecal valve, there will not be ileal stasis because the contents of the terminal ileum is then favored by gravity. When a recent meal fills a mobile cecum, and it drops into the pelvis, and a redundant sigmoid becomes filled with inspissated feces, it will so wedge the cecum in the pelvis as to render it almost immovable. I have observed this condition produce very marked distress and have seen immediate relief extended to the patient by

forcing the cecum upward into the abdomen. This has only been observed as an accident, occurring in the course of an examination in three or four cases.

The great omentum may be adherent in the lower abdomen or the pelvis, in such a way as to hold some section of the intestines securely in an abnormal position, and so simulate adhesions of this special section of the gut, as to give us a wrong reading. One case examined by me, in which I reported probable adhesions binding the left transverse colon in the left ileac fossa, was found at operation to present a dense fibrous band extending from the left lateral abdominal wall downward and inward to the pelvic structures, making a pocket between it and the posterior pelvic wall, in which the transverse colon was wedged and was only elevated after severing the bands. No adhesions of the transverse colon existed.

The so-called "Jackson's Membrane" and other evolutionary membranes and bands, and what I generally designate a contracted meso-colon, are best found by manipulation in conjunction with the fluoroscope in the vertical and horizontal position. Mesenteric bands and contracted mesentery have a predilection for forming at five places, which are: just above the cecum on the ascending colon; a short distance from the hepatic flexure; a few cm. below the splenic flexure; at the juncture of the descending colon with the ileal sigmoid; and at the juncture of the ileac and pelvic sigmoid. They may occur at other places, but the above-mentioned points are where they are most commonly found. Those just below the splenic flexure are frequently located by the patient taking a deep inhalation, which forces the splenic flexure downward, so that the drag is placed upon the fixed point. At other places they are best determined by manipulation.

I am convinced that Nature has established certain compensatory phenomena that equalize the material supplied the intestinal tract, and by that, tends to prohibit the reception of more material after a safe amount has been received, and that the quantity is dependent on the power of any special portion to digest the amount therein. I believe that pyloric spasm is partly due to a protest against more food entering the intestine after a given amount has proceeded, and that a spastic state at any point, is an attempt to regulate the amount ingested by the digestive system. Modification of this inhibitory function occurs when abnormalities develop, such as the intense spasmodic waves of peristalsis in the duodenum and ileum, the occasional isolated contraction in the upper half of the colon, and the intense spastic state of the lower half of the colon, which is commonly seen accompanying abnormal appendices, ileal kinks, and various adhesions.

Of the many cases I have examined, I have never had convincing evidence of reversed peristalsis; certain phenomena do occur following the administration of an enema, which may be looked upon as peristalsis carrying the intestinal contents backward. Careful observation will quickly show us that this is not due to a constriction of the colon below the material which is moving upward, but is simply a backward flow, passive in character, which occurs when expulsion is prohibited and the bowel relaxes above. I have seen two cases in which there was proof of the ascension of material that had been ingested. In one of these, the return had been from the lower colon to the cecum and in the other on the sixth day following the first bismuth meal, and after all was in the colon, there was a return as far as the duodenum. They were both cases of extreme atony, the entire organism being in a state of exhaustion.

Should the colonic contents become very fluid as the result of downward flow of a large quantity of the ileac feces, it can readily be seen that the bismuth mass could be disintegrated sufficiently to drift upward, the same as witnessed following an enema.

CHRONIC INTESTINAL STASIS—FLUOROSCOPIC AND X-RAY DIAGNOSIS IN THE LIGHT OF OPERATIVE FINDINGS—WITH ILLUSTRATIVE CASES*

By WILLIAM SEAMAN BAINBRIDGE, A. M., Sc. D., M. D., New York City.

A distinguished pathologist, in discussing the work and views of Sir W. Arbuthnot Lane with reference to chronic intestinal stasis, asks the question: "Is Sir Arbuthnot Lane justified in his teachings, or is he the victim of an obsession?"

"If his teaching be false it will die," says another, "if it be true it will form a landmark in the surgery of the twentieth century!"

Again, after having verified many of Lane's findings, another of his countrymen announces that he is "travelling hopefully."

From indifference to ridicule, from curiosity to earnest attention, the majority of surgeons who have given ear to Lane's views at all, have passed. A few have persistently followed his lead, and have sincerely endeavored to test his theories by actual experience, believing from the first that he had opened up a new and fruitful field of endeavor. Internists, gastro-enterologists, surgeons, and Roentgenologists have united in the determined effort to decide whether these teachings shall die, or whether the surgery of the twentieth century shall be revolutionized, in a measure, in accordance with Lane's views.

In this general effort the Roentgenologist has played a conspicuous part, and has rendered valuable service in the matter of making and verifying diagnoses. The splendid work of Jordan, in this connection, is doubtless familiar to all. It has served, in a measure, as a model for others who are working in this difficult field—for it cannot be denied that the gastro-intestinal tract *is* a difficult field for radiologists. How well they have succeeded has been expressed recently by members of this specialty, as follows:† "It was the X-ray used after the administration of a bismuth meal, that finally unlocked the door to a positive and scientific knowledge of the action of the alimentary canal." They also quote the familiar statement from Keen's System of Surgery (Sixth Edition): "The actual size and shape of the stomach, as known to the pre-roentgen anatomists, or its motor functions and peristaltic activity, as known to pre-roentgen physiologists, were almost as inaccurate as the map of Europe before Columbus proved the earth was spherical. The Roentgenologist who has repeatedly watched the behavior of a bismuth meal in its passage through the alimentary canal has a far more accurate idea of the normal processes of digestion than had the best pre-roentgen clinician."

Such statements apply, with absolute justice, to radiographic work of high quality. X-ray and fluoroscopic examinations carefully executed and properly interpreted, are of great value, and surgeon and Roentgenologist should co-operate in increasing skill in execution and interpretation. For it is equally true that unless radiographic examinations of the alimentary canal be made with an accurate understanding of the requirements of this particular part of the anatomy, and unless they be intelligently interpreted, they are of practically no value, and the surgeon who depends upon them for a guide as to whether to operate or not to operate will find himself falling into many difficulties.

*Read, in part, by invitation, before the American Roentgen Ray Society, at Cleveland, Ohio, September 9, 1914, and before the Michigan State Medical Society, Lansing, Mich., September 11, 1914.

†Boggs and Foster, *International Journal of Surgery,* April, 1914.

Undoubtedly the most expert work accomplished in this direction is that of Alfred C. Jordan, of London, who has been associated with Sir Arbuthnot Lane in so much of the latter's investigation of the subject of chronic intestinal stasis. Jordan's success in this line has been attributable in large measure to the fact that he has gone over his plates, made before operation, at the operating table, comparing step by step his fluoroscopic and radiographic findings with conditions actually found during operation. By checking up his errors in this way he has been able to better guard against them. He has thus developed the ability to make negative as well as positive diagnoses. Those who, like Jordan, are willing to devote the time and patience required in this checking-up method, will find a certain sense of security in their work that it must be difficult to acquire by confining one's effort to the X-ray laboratory. Such work, I fancy, will dispel forever the possibility of our following the will-of-the-wisp which the distinguished pathologist (Adami) has inferentially designated an obsession.

However, it is not the purpose of this brief communication to discuss the merits or demerits of Lane's theories concerning chronic intestinal stasis. I think we may dismiss, for the present, as proved, his contention that adventitious bands *do* form about certain portions of the gastro-intestinal tract, that they may cause kinking of the gut at points of fixation, and that the immediate result of this state of affairs is often a slowing of the contents of the great drainage canal,—a condition to which he has applied the term chronic intestinal stasis, with a long chain of symptoms which can be best explained by a toxic condition resulting from an absorption of poisons from the intestinal tract. If there is still a doubt in the minds of those who are studying the matter, I feel sure that the checking-up method of study alluded to, in which surgeon and radiologist co-operate at the operating table, will go far toward dispelling such doubts.

It is necessary, first, however, for both surgeon and radiologist to understand perfectly the mechanics of the great drainage scheme of the body. All this has been so clearly detailed in papers by Lane and his students that I need not take the time here to discuss the matter. One point, however, I wish again to reiterate, namely, that in searching for kinks in the gut it must be borne in mind, by radiologist as well as surgeon, that there is a difference in the relationships of the intestines when the patient is in the erect and in the prone position upon the back. In the upright posture there is, as all know, a tendency to a greater or less degree of general ptosis of the hollow viscera, and that it is this falling of the viscera which causes the strain on the points along the course of the drainage canal at which the lines of stress and strain have crystallized into definite bands. In the prone position, as on the operating table, this ptosis is temporarily overcome, of course, and no kink is visible upon superficial examination, no matter how definite it may be when the individual is in the upright position. By lifting up the bowel the kink comes into view. This is just the reason why the radiologist should study his subjects in both positions, and at the operating table.

It is important, as Lane and Jordan have so often repeated, that the alimentary tract be regarded as a whole, that its diseases should not be regarded as "isolated phenomena," but that local manifestations along its course and in accessory organs be regarded as expressions of a general disorder. As we all know, Lane maintains that many diseases, such as gastric ulcer, cancer, gall-stones, rheumatoid arthritis, and others, are the remote results of chronic intestinal stasis. This theory forms an important part of the "obsession" which the great pioneer is supposed by some to harbor. It is not the purpose of this communication to attempt to prove or disprove this theory. There seems, however, to be much food for thought just here, as some of the cases

which I shall presently show, will demonstrate. According to Jordan, "the general disease at the bottom of the case can always be revealed by a complete radiological investigation of the alimentary system," and it is just this contention which, it seems to me, should stimulate radiologists to make careful and painstaking investigations along the lines laid down by Lane and Jordan.

In this connection I wish to emphasize the importance of the fluoroscopic examination in all cases. "X-ray diagnosis after a bismuth meal," according to Jordan, "depends entirely upon observations with the fluorescent screen. It is all-important to watch the movements accompanying respiration, the peristaltic activities of the different parts, and to ascertain the presence of fixed parts (e. g., in the terminal ileum), and of thickened parts (terminal ileum, appendix, iliac colon, etc.) by direct manipulation under the fluorescent screen. The patient must, therefore, be as accessible to the observer as he would be to the surgeon about to operate upon him. In commencing the investigation," he continues, "we gain an important clue at the first examination when we observe the duodenum. This is without doubt, the most sensitive part of the alimenary tract; even the early stages of intestinal stasis produce their inevitable effect upon the duodenum which becomes distended from obstruction (by kinking) at the commencement of the jejunum. The difficulty this kink causes the duodenum is obvious when the duodenum is observed (by the fluorescent screen) full of bismuth emulsion. In the first place the duodenum is obviously enlarged; its vertical portion measures 4 to 5 inches instead of 2¾ to 3¼ inches as in normal cases. The width of the duodenum is often double that of the normal, the first part of the duodenum being especially dilated. More remarkable by far than the increased size is the altered behavior of the 'static' duodenum. It is exceedingly active, strong waves following one another along the four parts of the duodenum, and thrusting the contents before them. The strong waves are not effective, however; the contents get no farther than the third or fourth part of the duodenum; and as the wave passes off the whole of the contents flow back rapidly to the second (vertical) part. This event is often seen to recur over and over again, and for ten minutes or more no bismuth will enter the jejunum; then perhaps a peristaltic wave will come more powerful than any, and a full measure of bismuth fluid will enter the jejunum, the kink having been overcome for the moment. So powerful are the efforts of the 'static' duodenum that the entire organ gets distorted into various forms, giving the appearance of 'writhing.'" Thus, Jordan says, "The radiologist can demonstrate not only the end result (such as a gastric or duodenal ulcer), but also the various manifestations due to statis itself. They should make any surgeon think twice before he decides to be content with the old order of things."

I have quoted these statements from Jordan, who has had a wider experience, having worked with Lane for so long, than perhaps any other radiologist has had in the study of the particular conditions under discussion, because I wish, in so far as I am able, to encourage this kind of work. I have frequently noted the tendency of the X-ray worker to become discouraged after a few fruitless attempts at diagnosticating conditions involving the alimentary tract. The wonderful success which Jordan and those who have persisted have attained should encourage others to renewed determination.

In this connection I wish to express my sincere appreciation of the careful and painstaking work which Dr. Quimby, Dr. Cole, and others, have been doing in this direction. I have purposely selected for presentation on this occasion cases in each of which Dr. Quimby has made the fluoroscopic and radiographic examinations. He has presented the radiographic phase of these cases, showing the findings before operation, as revealed by fluoroscopic and X-ray examinations. By reference to his findings the operative findings may be tallied with them. This is another manner of presenting the checking-up method and is adopted largely for the purpose of stimulating interest in this comparative plan of study.

I may explain, in passing, how the drawings from which my lantern slides are prepared are made. In the first place, I try to have a stenographer present in the operating room, to whom are dictated the findings. The medical illustrator makes a rough sketch of the conditions found, just as they appear to him or her at the operation. It requires only a few minutes for the surgeon to demonstrate these to the artist, who is skilled in this kind of work. The findings are then checked up by the assistants, and sometimes by visiting surgeons. From this operating-room sketch the artist builds up the drawings, with the assistance of the stenographer's notes, the checkings of the assistants, and the findings of the surgeon. Each picture is, therefore, an accurate interpretation of conditions as actually found upon the operating table.

It is obviously difficult, however, to put into each picture every phase of the pathological condition. Therefore, for purposes of clarity, without the sacrifice of accuracy, each picture emphasizes some special point or points.

What has been said with reference to the difficulty of portraying in a single picture every phase of the pathological condition found in a given case, applies equally to the X-ray plates. Many plates would be required for such a complete demonstration.

For the above reasons all the findings shown in the drawings may not be represented in the X-ray plate or plates of the same patient, yet the features in which the operative findings shown corroborate the radiographic findings are quite sufficient to establish the importance of the X-ray as an aid to diagnosis in cases of presumptive chronic intestinal stasis.

In the following cases I have purposely omitted the general history, the treatment, the immediate and remote results, our only concern here being a comparison of the radiographic and fluoroscopic with the operative findings.

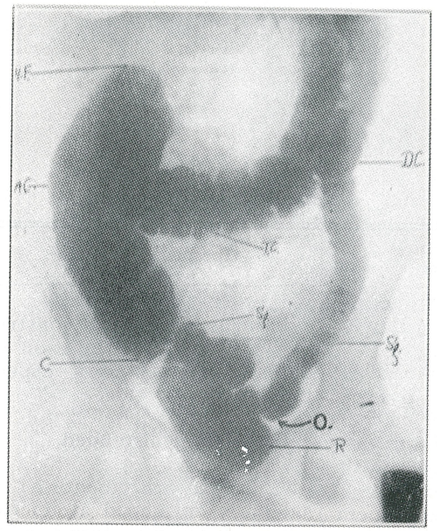
An inspection of both the operative findings and artist's sketches should be made to obtain a proper conception of conditions found within the abdomen at operation, and these should be compared with the Roentgenographic findings to get full confirmation of the value of the X-rays when preoperative determinations are made.

QUIMBY AND BAINBRIDGE

Case No. I

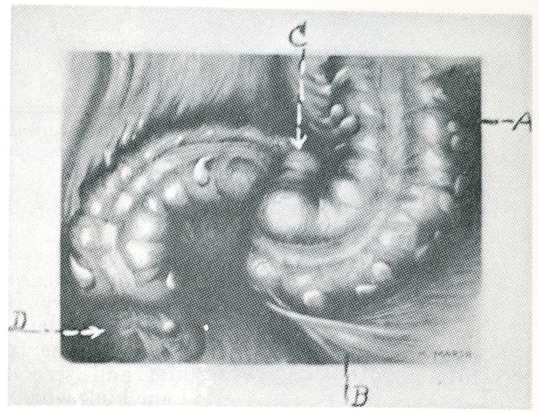
	Radiographic Findings (Before Operation)	Operative Findings
No. I. Male, 41. Referred by Dr. J. Douglas Nisbet, New York City. Operation, N. Y. Polyclinic Hosp., April 24, 1914.	Gastric delay of mild degree, due to interference in duodenum, pronounced only when patient was in erect position. Pyloric ulcer. Evidence of small mucous ulcer in first portion of duodenum. Chronic appendicitis; appendix kinked near its tip. Patulous ileocecal valve. Angulation in right transverse colon, due to a loosely formed membrane binding the hepatic angle. Acute angulation of splenic flexure. Evidence of a membrane binding pelvic sigmoid. General appearance of structures occupying lower right abdomen indicates probability of "Jackson's membrane" incompletely formed and interfering with various structures.	Stomach prolapsed and enlarged, but no evidence of ulcer on either stomach or duodenum, as determined by palpation and inspection.* Appendix angulated, congested and bound tightly to pelvis; filled with fecal matter. Patulous ileocecal valve. Cecum and part of ascending colon attached by band to iliac fossa on lateral wall. Terminal ileum and head of colon bound tightly to brim of pelvis. Accentuated last kink of sigmoid, with angulating band of adhesions. Colon dilated above and colon and rectum below.

*A mucous ulcer may be present and not seen by the operator unless stomach or intestine be opened.



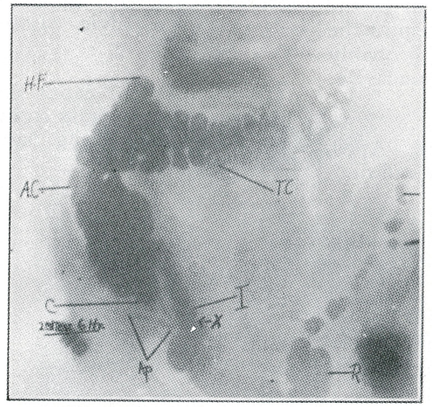
Case I, Fig. 1.

C. Cecum.
T. C. Transverse Colon.
Sg. Sigmoid.
O. Kink of Sigmoid, "Last Kink."
R. Rectum.



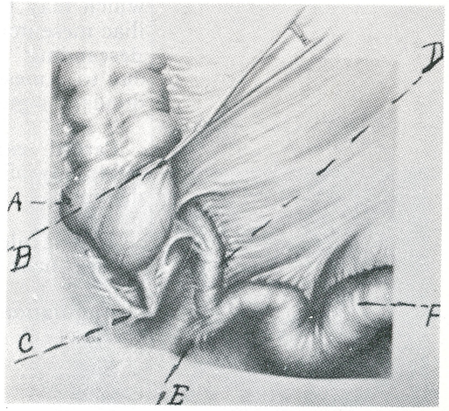
Case I, Fig. 1-a.

A. Descending colon.
B. Band causing accentuation of "last kink."
C. "Last kink," greatly accentuated.
D. Rectum.



Case I, Fig. 2.

C. Cecum.
A. C. Ascending Colon.
I. Terminal Ileum.
Ap. Appendix.
The kink in the Appendix is seen in that portion lying close to the Ileum.
The ileal kink is a fixed point in the Ileum, marked X.



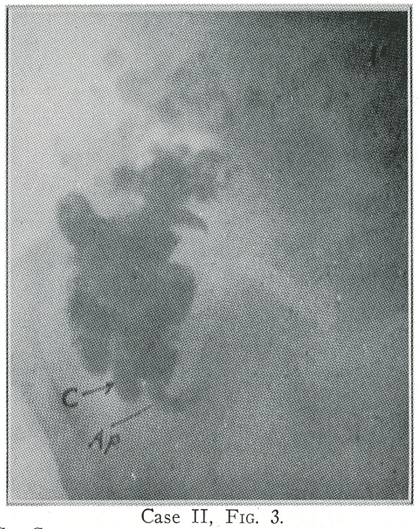
Case I, Fig. 2-a. (At a higher level.)

A. Cecum.
B. Forceps holding up caput coli, which had become dilated, forming a large flabby pouch.
C. Angulated appendix, with bands.
D. Constricted portion of terminal ileum, with tight attachment to pelvic wall.
E. Lane's band (Ileopelvic band).
F. Dilated ileum.

Case No. II

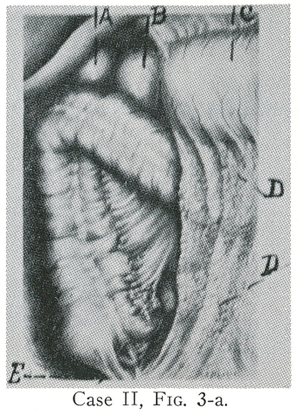
	Radiographic Findings (Before Operation)	Operative Findings
No. II. P. Male, 38. Referred by Dr. William Van Valzah Hayes, New York City.* Operation, N. Y. Polyclinic Hospital, April 24, 1914.	Examination, July, 1913. Gastric ulcer on the lesser curvature near the pylorus. Gastric delay which may be due to angulation of the duodenum at the juncture of the first and second portion. A Lane kink which is only operative in the erect position, there being no organic change or kink producing obstruction when the patient is horizontal. There is some regurgitation of the enema into the ileum. A chronic type of appendix, which may be adherent to the iliac mesentery. A loop in the descending colon, probably due to a mesenteric band. Redundant sigmoid. Partial examination, April, 1914, only of stomach and duodenum. Gastric ulcer, on lesser curvature, near pylorus. Angulation of duodenum.	Pylorus somewhat constricted, with slight induration on upper and posterior aspect, toward gastric side. Duodenum distended. Gastro-hepatic omentum considerably thickened at its free edge, over the foramen of Winslow; it was also shortened. Opposite this point on greater curvature was a thickened portion of great omentum which formed a band extending down to the cavum Retzii and to right iliac fossa, below appendix. Typical ileopelvic (Lane's band), very strong. Terminal ileum, caput coli, and angulated appendix tightly bound down by strong bands of adhesion.

*Note: This patient was examined by Dr. Alfred C. Jordan, in London, last year. On April 21, 1914, he saw the patient again, this time in my office, in consultation with me. At this time he examined the radiographic plates made by Dr. Quimby. Dr. Jordan said: "There is well marked distension of the duodenum, with tenderness to pressure. The terminal coil of the ileum is hypertrophied and feels like a cord. There is tenderness over this coil."



Case II, Fig. 3.

C. Cecum.
Ap. Appendix.
The portion of the appendix exhibited is the first half; the remainder curves backward.
The bismuth in the cecum demonstrates the presence of cecal stasis.

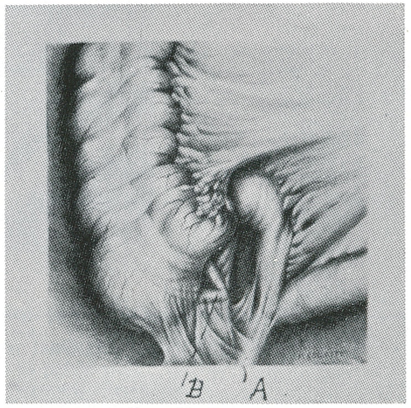


Case II, Fig. 3-a.

A. Gall-bladder.
B. Dilated duodenum.
C. Stomach.
D. Great omentum, attached to upper and anterior surfaces of bladder, and to right iliac fossa.
E. Bands about appendix and head of colon. (See Fig. 4-a for enlargement.)

Case II, Fig. 4.

This plate was taken immediately after the bismuth enema, and six hours after a bismuth meal. The fixed point in the terminal ileum is marked K.



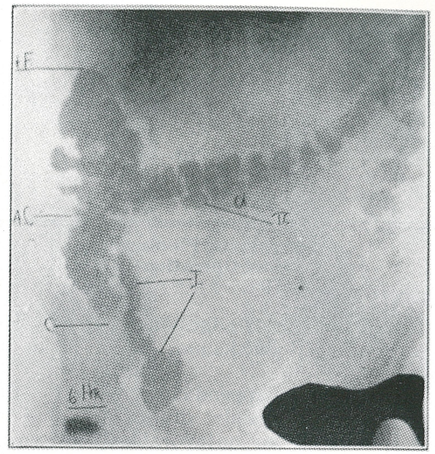
Case II, Fig. 4-a.

A. Ileopelvic (Lane's) band.
B. Angulated appendix.

Case No. III

	Radiographic Findings (Before Operation)	Operative Findings
No. III. F. Male, 40. Referred by Dr. William Van Valzah Hayes, New York City. Operation, Alston's Private Hospital, June 18, 1914.	Kinking of duodenum at juncture of first and second portions. Evidence of ulcer at this place. Moderate dilatation of duodenum.* Band constricting terminal ileum. Evidence of a loosely formed adhesion or band in right transverse colon; this does not seem to offer material obstruction. Kinking of sigmoid at juncture of iliac and pelvic portions.	No duodenal constriction. Ileum pulled down alongside of cecum, and adherent to pelvic floor. Cecum dilated, rotated and firmly adherent to lateral wall of pelvis. Sigmoid colon very redundant and angulated by adventitious kinking band.

*It is to be noted that a horizontal position often corrects a simple kink.

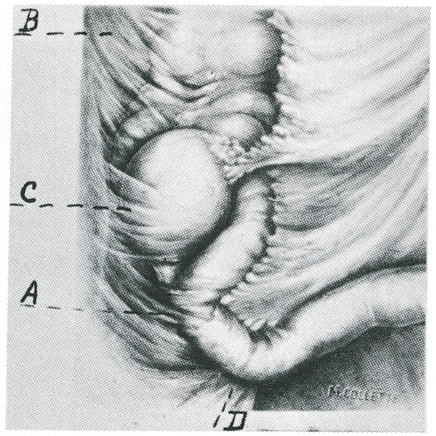


Case III, Fig. 5.

C. Cecum.
A. C. Ascending Colon.
I. Ileum.

The terminal ileum and cecum cannot be separated, and except that the terminal portion is almost straight in the Roentgenogram the fixed relationship between the terminal ileum and cecum is as manifest as in the accompanying sketch.

The thinned-out portion of the ascending colon above the cecum corresponds to the segments of the attached membrane.

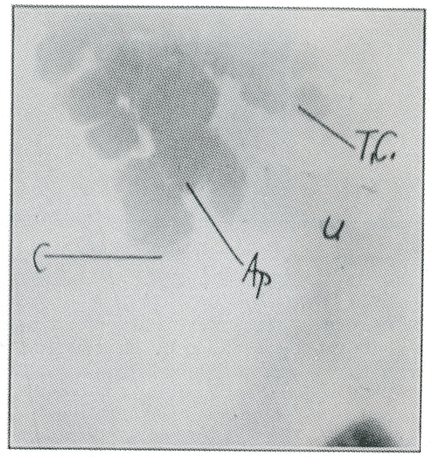


Case III, Fig. 5-a.

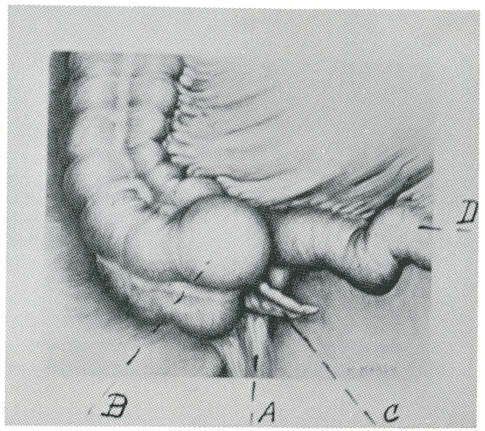
A. Bands of adhesion attaching terminal ileum to posterior wall of right iliac fossa.
B. "Jackson's membrane."
C. Twisted caput coli attached to pelvic wall.
D. Ileopelvic band. (When terminal ileum is allowed to drop into pelvis, as in upright posture, there is marked kinking at this point.)

Case No. IV

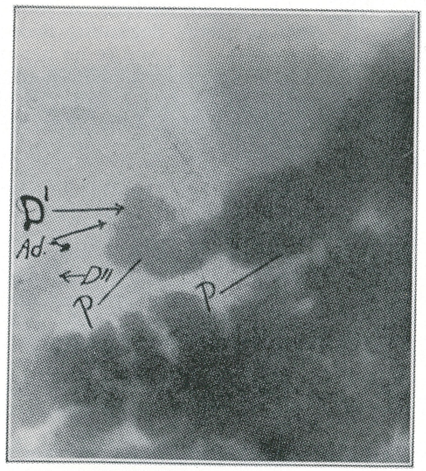
	Radiographic Findings (Before Operation)	Operative Findings
No. IV. E. Male, 38. Operation, N. Y. Polyclinic Hospital, March 24, 1914.	Evidence of adhesions of first portion of duodenum. Chronic appendicitis. While appendix readily drains, it is placed in an unfavorable position, especially when patient is erect. There is evidence that it is kinked. Loosely formed adhesions between ascending and transverse colon, producing an acute angulation in the latter portion of colon. A mesenteric band or a contracted mesentery just above iliac crest on ascending colon. Patulous ileocecal valve. There may be a band just above cecum.	Healed ulcer of duodenum ¾ in. beyond pyloric orifice. Below site of ulcer a number of bands extended from behind across duodenum, indenting it toward transverse colon and greater curvature of stomach. Transverse colon much collapsed. Hepatic flexure hung downward almost to umbilicus. Splenic flexure well supported. Mobile cecum; posterior band was anterior and below, forming an angle, around a fixed point at the base of the appendix. The mid-point of the appendix, which was five inches long, represented a band extending into pelvis, around which mobile cecum rotated. Patulous ileocecal valve. Dilated terminal ileum. Several adventitious bands about sigmoid. Ileopelvic (Lane's band) with meso-appendix attached to it.



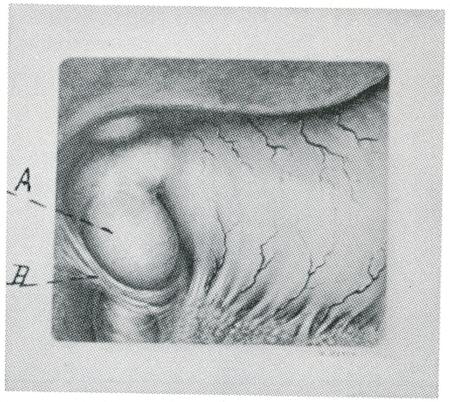
Case IV, Fig. 6.
C. Cecum.
Ap. Appendix.
By forcible retraction upward a small portion of the appendix could be seen, and its relative position determined.



Case IV, Fig. 6-a.
A. Very strong ileopelvic (Lane's) band.
B. Mobile cecum.
C. Meso-appendix attached to Lane's band.
D. Dilated terminal ileum, with patulous ileocecal valve.



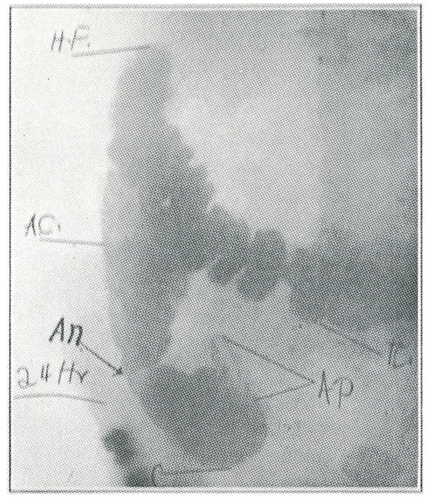
Case IV, Fig. 7.
D'. First portion of Duodenum.
D''. Second portion of Duodenum.
Ad. Location of Adhesions of the Duodenum.



Case IV, Fig. 7-a.
A. Dilated duodenum.
B. Band of constriction across duodenum.

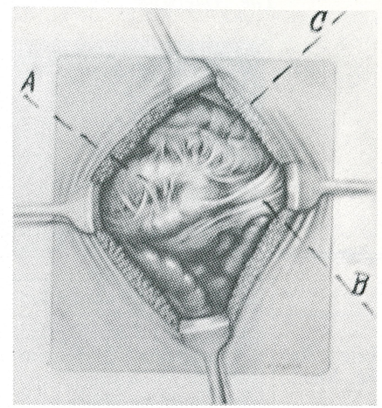
Case No. V

	Radiographic Findings (Before Operation)	Operative Findings
No. V. X. Female, 45. Operation, St. Elizabeth's Hospital.	Ulcer near pylorus. Evidence of small diverticulum above lesser curvature; this did not remain constantly filled. Evidence of adhesions near apex of conus duodenalis. Ptosis of cecum. Appendix adherent and kinked near its middle; its position suggested that it was probably attached to ileum or its mesentery; it is of chronic or non-functionating type. Probably two mesenteric bands on ascending colon, one just above cecum, the other just below hepatic flexure. Probably loosely formed adhesion to left transverse colon. Pelvic sigmoid redundant and dilated. Rectum dilated.	Transverse and ascending colon adherent to anterior abdominal wall and to falciform ligament of liver. Ascending colon adherent to transverse colon by strong bands; ascending colon angulated on itself, and held tightly to the lateral wall, deep down in the abdomen, the angulation almost obstructing its lumen, about midway between hepatic flexure and ileocecal valve. Chronic appendicitis. Appendix free. On under surface of mesentery of ileum beginning ileopelvic band. Practically no hepatic flexure; transverse colon held up only by bands to anterior abdominal wall and by "Jackson's membrane." Duodenum greatly dilated, duodeno-jejunal kink below. Scar of old ulcer constricting pylorus with adhesions below, catching hold of great omentum and dragging it upwards. Ulcer scar on lesser curvature. Beginning evolutionary bands on under surface of mesentery of ileum.



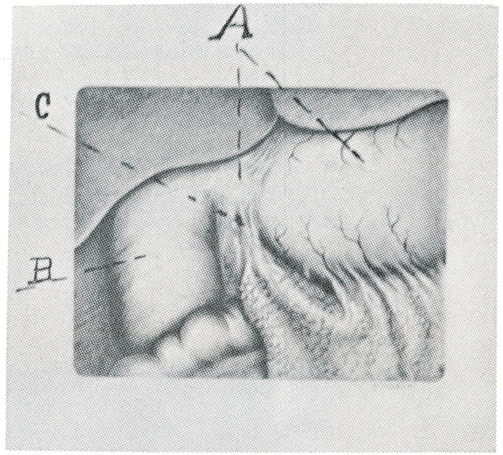
Case V, Fig. 8.

C. Cecum.
Ap. Appendix.
An. Angulation of Ascending Colon; this corresponds to the location of the adhesions of the ascending colon, which produced the most marked deformity.



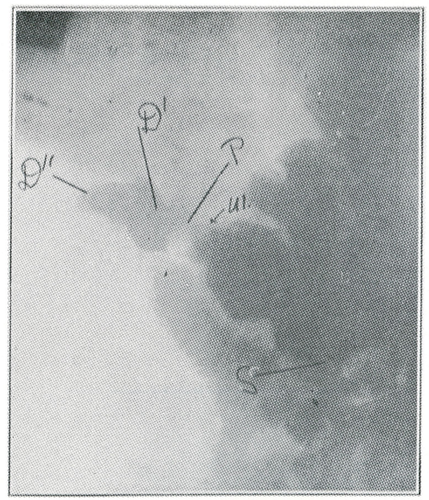
Case V, Fig. 8-a.

A. Ascending colon, angulated, with many adhesions.
B. Adhesions from anterior abdominal wall to ascending colon.
C. Transverse colon fastened by adhesions to kinked portion of ascending colon, near hepatic flexure.



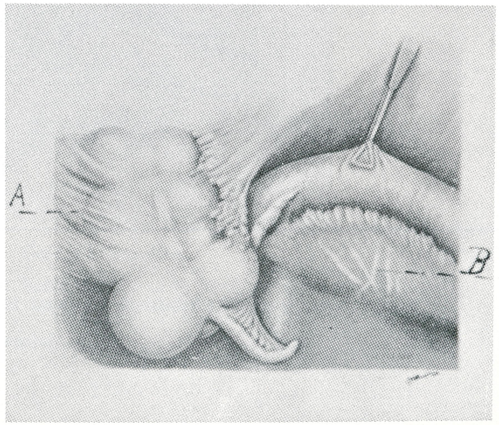
Case V, Fig. 9-a.

After separating adhesions shown in Fig. 8-a, the following conditions were found in right upper quadrant:
A. Sites of old ulcers.
B. Dilated duodenum.
C. Edge of great omentum attached to pyloric scar.



Case V, Fig. 9.

There is deformity on the gastric side of the pylorus, which was constant throughout the series of stomach plates. There was constant defect in the duodenum near the apex of the conus-duodenalis.

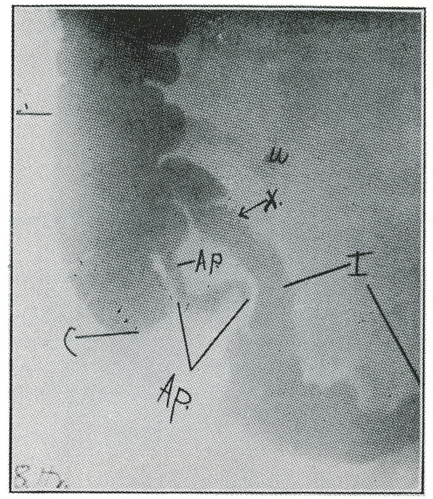


Case V, Fig. 9-b.

A. "Jackson's membrane."
B. White lines showing beginning lines of stress to form ileopelvic bands.

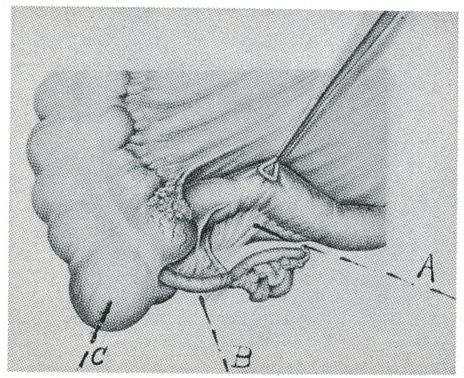
Case No. VI

	Radiographic Findings (Before Operation)	Operative Findings
No. VI. M. Male. Referred by Dr. H. M. Fleck, Bridgeport, Conn. Operation, N. Y. Polyclinic Hospital, Jan. 31, 1914.	Adhesions of pyloric end of stomach; these may involve first portion of duodenum. Ileal kink. Kinked appendix, presenting evidence of being adherent at tip; the kink is evidently due to a band or contracted portion of meso-appendix. Evidence of a few adhesions involving transverse colon.	Appendix, extending to left, large, distended with fecal matter, adherent at about its middle, where it was twisted, but not to the point of obstruction. Adhesions below ileum. Ileopelvic band. Omentum extensively adherent to under surface of liver and pyloric region. Mobile cecum.



Case VI, Fig. 10.

I. Ileum.
Ap. Appendix.
C. Cecum.
The kink of the appendix can be seen near the end of the filled portion.
The fixation point in the terminal ileum is marked X, and corresponds to the position of the ileal kink.

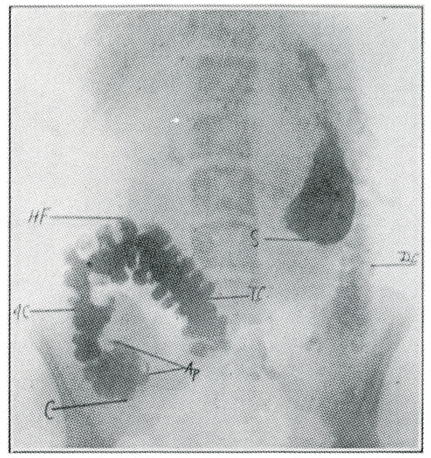


Case VI, Fig. 10-a.

A. Ileopelvic band.
B. Torsion of appendix, distended with fecal matter.
C. Mobile cecum.

Case No. VII

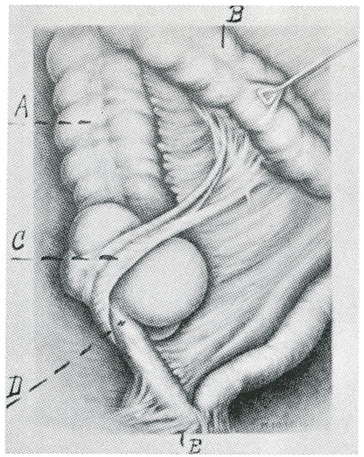
	Radiographic Findings (Before Operation)	Operative Findings
No. VII. M. Female, 27. Referred by Dr. L. C. Menger, Brooklyn, N. Y. Operation, Alston's Private Hospital, May 30, 1914.	Gastric delay due to kinking of duodenum. Ileal kink; this does not present all the characteristics of a simple Lane's kink. Appendix probably adherent at its tip, but a contracted meso-appendix may account for its fixation. No interference with drainage of appendix. Doubtless subject to traction when patient is erect. Some evidence of fixation of middle of transverse colon.	Narrow band running from transverse meso-colon to pylorus, causing marked constriction of pyloric orifice. Evidence of old ulcer on extreme upper point of first portion of duodenum and approaching pylorus. Greatly distended duodenum. Transverse colon prolapsed into pelvis. Appendix long, curved toward iliac crest; its tip firmly adherent by fibrous bands to transverse meso-colon, forming complete half circle. Cecum long and mobile. Ileum, at point four inches from ileocecal valve, firmly adherent to pelvic floor by fibrous band three inches wide. Pelvic colon firmly anchored above brim of pelvis by three bands.



Case VII, Fig. 11.

Ap. Appendix.
C. Cecum.

There is a constriction just above the cecum, and the appendix passes up over the cecum in somewhat the same manner as exhibited in the accompanying tracing, except that in the latter the cecum has been carried up to expose the ileum. The twist of the cecum accounts for the decrease in caliber at the beginning of the ascending colon.

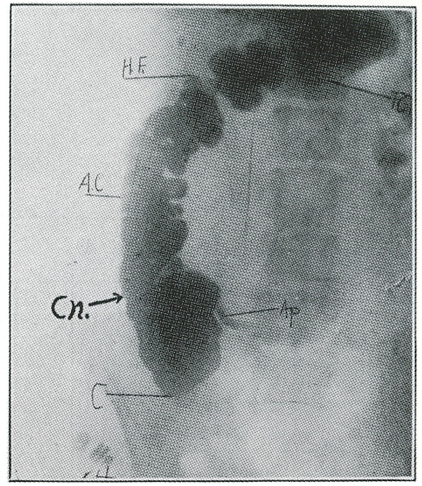


Case VII, Fig. 11-a.

A. Ascending colon.
B. Enteroptic transverse colon.
C. Appendix adherent close to transverse meso-colon, with volvulous cecum.
D. Terminal ileum.
E. Broad ileopelvic band.

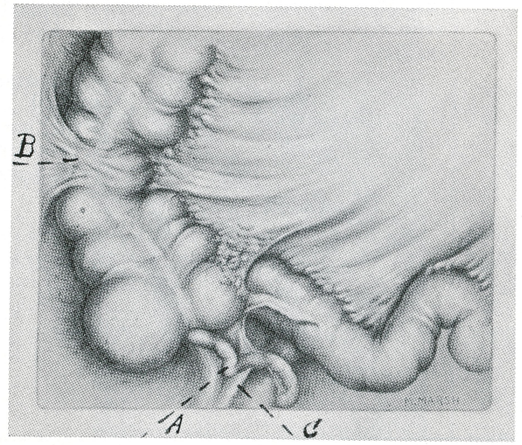
Case No. VIII

	Radiographic Findings (Before Operation)	Operative Findings
No. VIII. B. Female, 37. Operation, Alston's Private Hospital, March 18, 1914.	Gastric ulcer. Chronic appendicitis. Appendix lying transversely, tip apparently adherent beneath ileal mesentery. Constriction or kink near tip. Band or membrane just above cecum. Probably a small mesenteric band on descending colon. Evidences of adhesions binding iliac sigmoid in iliac fossa.	Ulcer on middle of lesser curvature of stomach. Broad band of old adhesions from inner half of appendix to pelvis. Distal half of appendix free. Adhesions between ascending colon and right parietal peritoneum. Left ovary buried in mass of adhesions which were attached to sigmoid colon, giving it an excessive angle. A light band of adhesion at duodeno-jejunal angle.



Case VIII, Fig. 12.

Ap. Appendix.
C. Cecum.
A. C. Ascending Colon.
Cn. Constriction in the ascending colon corresponding to the band illustrated on the accompanying cut.
The proximal portion of the appendix is filled with bismuth.

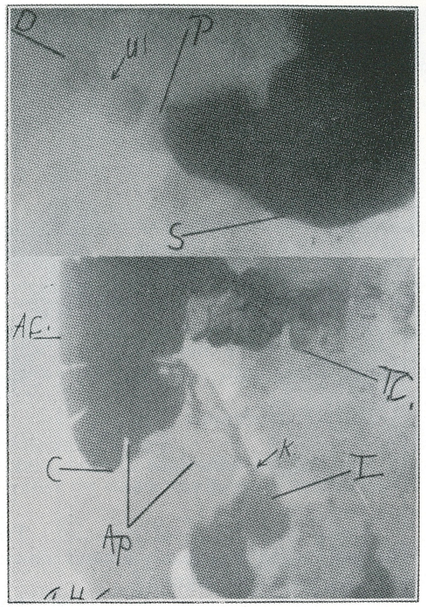


Case VIII, Fig. 12-a.

A. Twisted appendix.
B. Very strong band across ascending colon, causing considerable obstruction.
C. Strong band from appendix to pelvis.

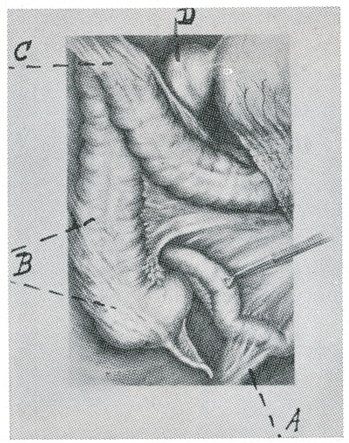
Case No. IX

	Radiographic Findings (Before Operation)	Operative Findings
No. IX. E. Female, 12. Operation, N. Y. Skin and Cancer Hospital, May 25, 1914.	Duodenal ulcer. Many adhesions extending from duodenum to pylorus. Ileal kink, due to adherent appendix. Point of limited mobility of terminal ileum at this place. Patulous ileocecal valve. Appendix evidently kinks when patient is erect, which probably accounts for the poor drainage at tip. Angulation of sigmoid. Some signs of adhesions of sigmoid just above rectum. Moderately redundant sigmoid. Dilated rectum.	Duodenum slightly dilated, showing scar of old ulcer one inch from pylorus. Greater curvature slightly prolapsed. Hepatic flexure of colon drawn up by a band, forming angulation at that point. "Jackson's membrane." Patulous ileocecal valve. Strong band across duodenum just below scar of old ulcer, causing constriction and dilatation. Typical ileo-pelvic band, causing kink. Appendix presented fairly normal appearance on its external surface, but in its interior several small concretions could be palpated.



Case IX, Fig. 13.

S. Stomach.
P. Pylorus.
D. Duodenum.
Ul. Ulcer.
Ap. Appendix.
C. Cecum.
A. C. Ascending colon.
I. Ileum.
K. Location of ileal kink.



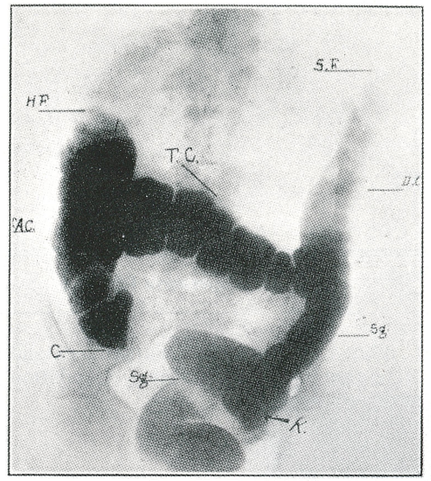
Case IX, Fig. 13-a.

A. Ileopelvic (Lane's) band.
B. "Jackson's membrane."
C. Strong band, with angulation of hepatic flexure.
D. Scar of duodenal ulcer.

Case No. X

	Radiographic Findings (Before Operation)	Operative Findings
No. X. B. Male, 32. Referred by Dr. Hermann Eichhorn, New York City. Operation, N. Y. Polyclinic Hospital.	Duodenal ulcer, with incomplete obstruction near apex of conus duodenalis. Dilated duodenum. Evidence of adhesions around cecum and appendix. Acute angulation of splenic flexure; there is probably a band binding the pelvic sigmoid.	Stomach prolapsed well down below umbilicus. Hepatic flexure just above umbilicus. Pyloric ulcer scar. Distinct accentuation of last kink, causing fixation of pelvic colon. Transverse colon prolapsed down into true pelvis. Appendix angulated, but formed no part of ileal stasis.* Distinct duodeno-jejunal kink. Duodenum markedly dilated. Constricting band across duodenum extending from under surface of liver.

*Cut 14-a shows bands about cecum and attachment of appendix to the ileopelvic band.

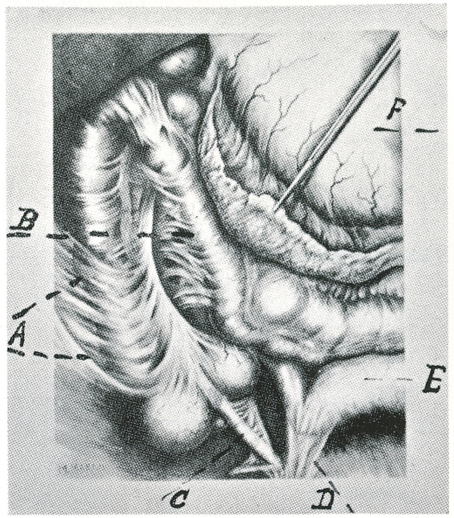


Case X, Fig. 14.

This was taken a few minutes after the enema was administered.

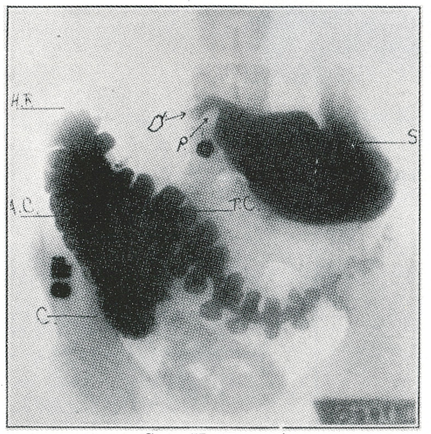
C. Cecum.
A. C. Ascending Colon.
T. C. Transverse Colon.
Sg. Sigmoid.
K. Sigmoid Kink.

The pronounced interference with the progress of the enema into the ascending colon, especially that portion having the bands, is made manifest by the relatively small quantity in this part, and so the caliber is less than that of the cecum.



Case X, Fig. 14-a.

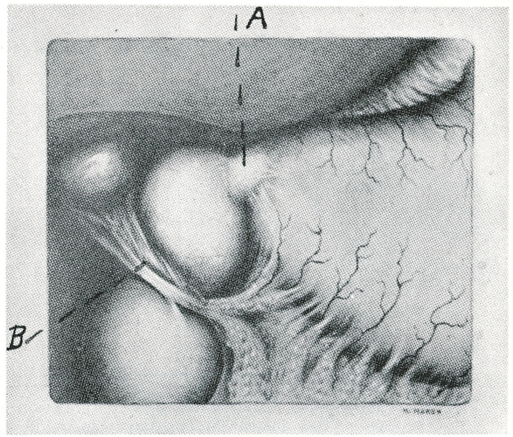
A. Heavy bands attaching abdominal wall to ascending colon.
B. Bands attaching transverse colon to ascending colon.
C. Angulated appendix attached to edge of ileopelvic band.
D. Ileopelvic band.
E. Dilated ileum.
F. Dilated stomach.



Case X, Fig. 15.

S. Stomach.
P. Pylorus.
D. First portion of Duodenum, which is incompletely obstructed by a band.
C. Cecum.
A. C. Ascending Colon.
T. C. Transverse Colon.

The bismuth in the colon is that portion which had escaped from the stomach soon after the meal had been administered. A constriction can be seen just above the cecum.



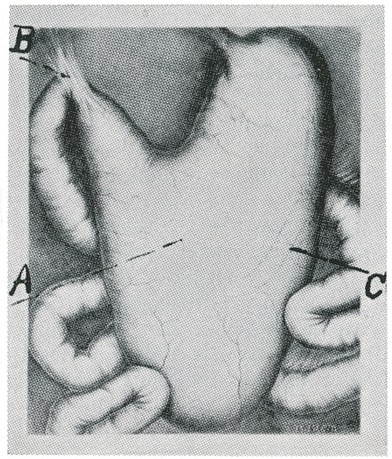
Case X, Fig. 15-a.

A. Scarred pylorus, contracted.
B. Heavy band across duodenum from under surface of gall-bladder to edge of great omentum, causing hour-glass shape of dilated duodenum.

Case No. XI

	Radiographic Findings (Before Operation)	Operative Findings
No. XI. N. Male, 32. Referred by Dr. William Van Valzah Hayes, New York City. Operation, N. Y. Polyclinic Hospital, Feb. 11, 1914.	Stomach atonic and dilated. Very prolonged gastric retention due to obstruction of duodenum. Deformity about middle of conus duodenalis. Excessive gastric retention prevented further intestinal examination.	Stomach enlarged, extending clear to bladder. Angulation of pylorus.

NOTE:—Subsequent X-ray plates showed reduction in size of stomach about one-half. Anticipating such a reduction, the gastro-enterostomy was made, as indicated in Fig. 16-a, (C), so that, after contraction, it would be at the most dependent portion of the stomach.



Case XI, FIG. 16-a.
A. Greatly dilated stomach, extending to symphysis pubis.
B. Angulation at pylorus.
C. Site of gastroenterostomy.

TREATMENT OF ACUTE ROENTGEN RAY DERMATITIS

By W. J. DODD, Boston.

I feel as though one should apologize for mentioning such a subject before a gathering of Roentgenologists, some of whom have probably not seen such a condition, certainly not in their own practice.

Two or three years ago this paper would have been unnecessary; today, I am afraid it is. Powerful apparatus is being installed in many small hospitals as well as in private laboratories. Untrained and unqualified men may be put in charge. If this be the case, sad results may follow and much harm be done, both to the individuals as well as to this wonderful and valuable branch of medical work.

Dr. Pfahler has already sounded a warning. The advent of the great invention of Dr. Coolidge has added another source of danger if placed in the hands of those ignorant of its power. Roentgen therapy in certain uterine conditions has opened up a great field. Unfortunately this will not be used by Roentgenologists alone as it should be.

It is this fact that leads me to suggest that you, as Roentgenologists, will see probably more cases of X-ray dermatitis in the future than in the past, because you will be called in consultation to see them. Such has been my experience, in the last two years more than ever before.

Twelve cases have come under my observation in the last year. Seven cases of alopecia resulting from exposure for frontal sinuses; three resulting from a small high frequency coil used in dental work, and two from fluoroscopic observations to determine the presence if possible of a Pott's fracture. One other, the most severe, was following the treatment for a lesion on the back of the hand for lupus. The frontal sinus cases were all exposed through aluminum filters, a large transformer being used, repeated exposures rather than long individual exposures being the cause of the injury.

It is this experience that prompts me to emphasize Dr. Pfahler's warning given some time ago. We all know that there is absolutely no danger when the trained Roentgenologist does this work. Occasionally we are going to get reactions in certain cases where Roentgen therapy is applied and it is to this class I particularly suggest this exceedingly simple and absolutely efficacious remedy.

To many it is undoubtedly familiar. The prescription is an old one and not original. I was first led to use it seventeen years ago. A boy came to me with his hands all covered with huge blebs and stained a deep yellow as though he had been burned with nitric acid. I told him that I thought it was a nitric acid burn, but he assured me that he had never used nitric acid and stated he had been running a small rubber plate static machine at the Food fair, exhibiting his hand through the fluoroscope.

The treatment given was what is known as white-wash. The lesion completely healed. I have never yet seen a case of acute X-ray dermatitis where it failed to completely heal the lesion except in two cases that were sent in to the hospital for treatment. These cases had progressed to the sloughing stage, and in such cases it is useless except to relieve the pain. In these cases there is always a deep central area that does not yield to this treatment.

The wonderful application of radium as demonstrated by Dr. Eugene Caldwell, or excision followed by skin graft, is the only treatment. In chronic X-ray dermatitis it is of no use except to relieve the irritation.

Mr. Kinraide, of Boston, who was exposed more than many operators, shows no lesions on his hands. He always bathed them in bicarbonate of soda solution. I have tried the same treatment in several cases as a preventive and am sure that there in some argument in favor of this method. These were desperate cases and the patients were told a reaction might result. I was sure it would, if preventive treatment had not been applied. This was before the use of filters. Recent experiments lead me to the conviction that this simple remedy is a preventive as well as a cure for acute X-ray dermatitis and we hope soon to publish the result of these experiments.

If we are correct, I believe we can give multiple massive doses without getting a reaction. Of course, we can use filters, but if we can get more energy to the part to be treated without danger to the skin and underlying structure, we shall gain just so much more. This is only a suggestion and experiments must be carried out before advising this method.

The treatment for the acute Roentgen dermatitis is as follows:

R. Zinc Oxide..... ½ oz.
Phenol ..... ½ dr.
Glycerine ..... 1 dr.
Aquae Calcis..... 8 oz.

Shake well and bathe area for five to ten minutes, twice or three times a day. Avoid all heavy dressings and when possible expose the lesion to the air. Do not apply this remedy on a dressing and allow to remain for five to ten minutes, but sop it on and let the air get to the lesion. Under no conditions use an ointment. Use a fresh quantity of wash every time it is applied, and do not leave exposed to the air.

DISEASES OF THE ACCESSORY SINUSES

By DR. ARIAL W. GEORGE, Boston, Mass.

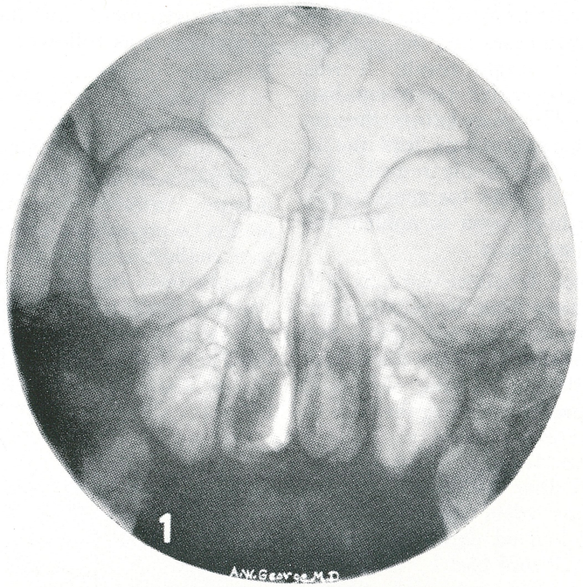


PLATE I—Roentgen plate of normal sinuses.

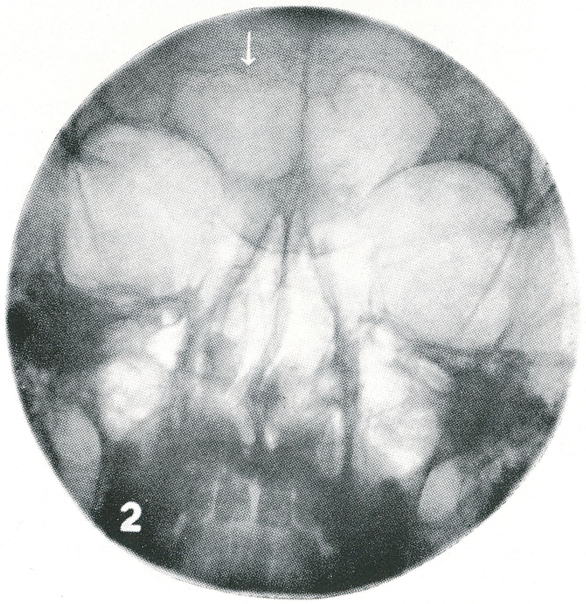


PLATE II—Shows involvement of the left frontal sinus due to a polypoid condition, not pus; characterized in the plate by a lack of uniformity of the shadow. Mottling suggestive of growth, not pus.

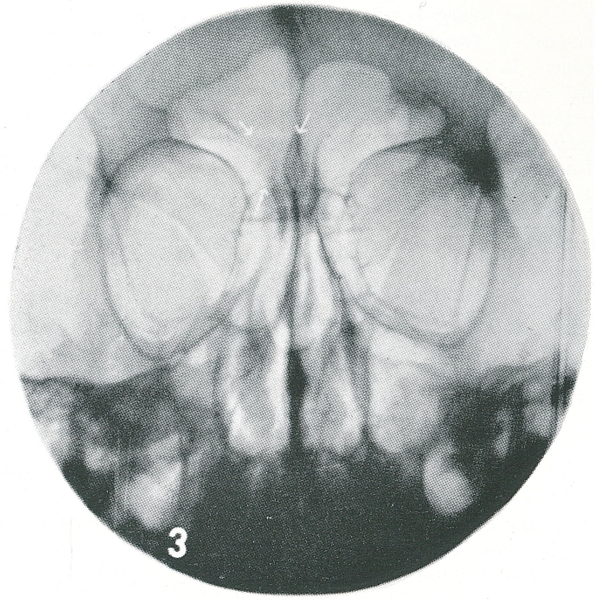


PLATE III—Shows a small osteoma of the left frontal sinus which was removed and confirmed by operation.

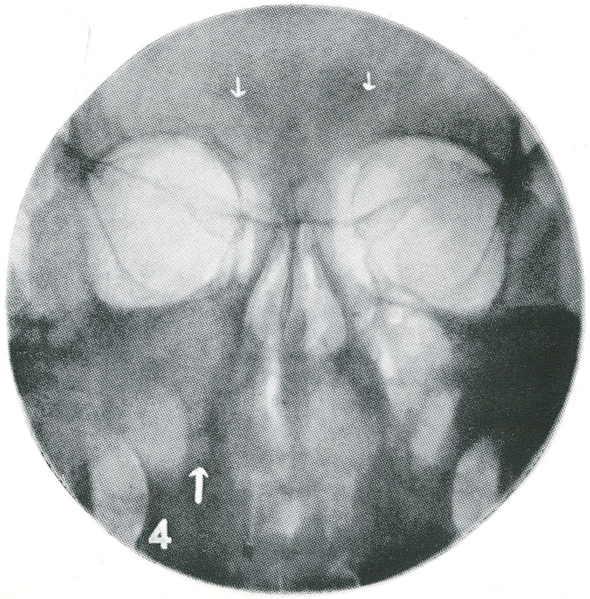


PLATE IV—Shows marked involvement of both frontal sinuses and left antrum. Sinuses were so small that they are hardly distinguishable on the plates. Operation.

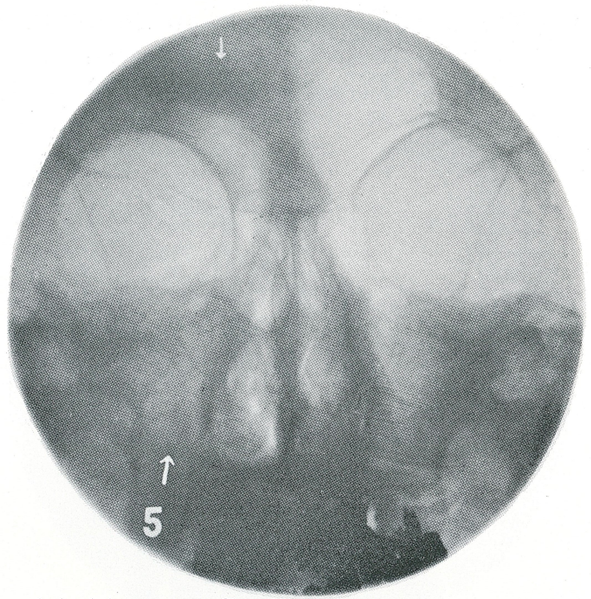


PLATE V—Disease of the left antrum. Chronic and suppurating process of the left frontal sinus. Characterized in the plate by sclerosis of the bone and obliteration by new bone formation.

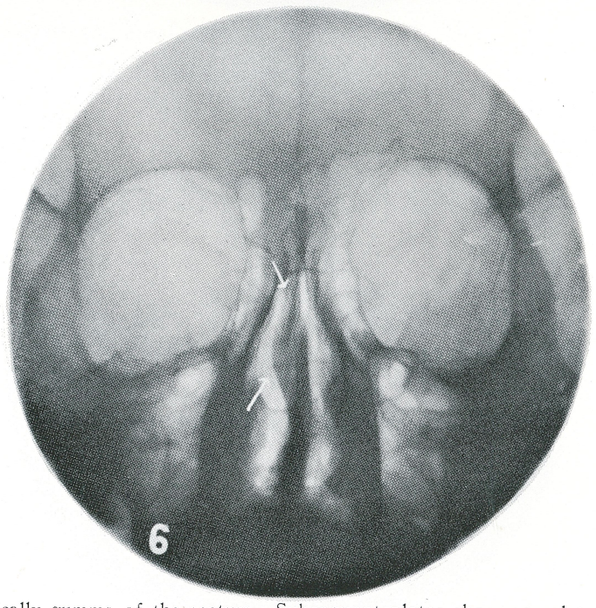


PLATE VI—Clinically gumma of the septum. Subsequent plates show complete involvement of the nasal cavity.

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EDITORIAL

We are in receipt of a letter from Dr. George C. Johnston, chairman of the executive committee, in which he states that the result of a recent postal card canvass of the members shows a very large majority in favor of meeting at Atlantic City. The majority was so decisive that the executive committee decided that the next meeting should be in Atlantic City. Out of a total of 127 votes over one-half were in favor of Atlantic City with the rest scattering. While it is perhaps often advisable for the executive committee to resort to a popular vote to enable them to choose a place of meeting, it should hardly be taken as a good precedent, in as much as the majority of the members living in the east might naturally prefer to keep the meeting place convenient to their own insular environment and then render the society, in this matter, a local rather than a national affair. We feel, however, that the great enthusiasm shown at the last meeting will be perpetuated so that the coming meeting will be a source of pleasure and compliment to those who will have it in charge.

The articles of Drs. Quimby and Bainbridge presented in this issue are examples of the tendency in modern medicine to unite different specialties in a search for truth and for the best results for the patient. Properly co-ordinated team work will always be productive of distinct gains in medical science. The article of Dr. Skinner, which was read in connection with the above mentioned articles will appear in the next issue of the Journal with the accompanying discussions.

ABSTRACTS

White, Franklin W., M. D., Boston, and Leonard, Ralph D., M. D., Boston: Roentgen Ray evidence in early and latent cancer of the stomach. (Boston Med. and Surg. Jour., Oct. 1, 1914.)

The material for this study consisted of 114 hospital and private cases, examined within a year and a half by clinical and Roentgen Ray methods in which cancer of the stomach was suspected or found. In 40 cases cancer was ultimately proved, and in 66 ultimately ruled out, 8 remain doubtful at present. Thirty-three cases of cancer are excluded from this paper as being well developed, leaving 81 early, latent or suspected cases. These 81 cases were classed at the end of our clinical and Roentgen Ray examination, as follows: 1 (or 2) early, 6 latent, 62 ruled out, 12 (or 11) doubtful. In all cases a complete physical examination was made, usually including tests of secretion and motility of the stomach, and an examination of the feces and gastric contents for blood. With the Roentgen Ray both fluoroscope and plates were used, immediately after a bismuth meal, and at six and twenty-four hour intervals.

In 33 cases of proved cancer, the diagnosis was definitely made by the well-known signs and symptoms and the Roentgen Ray examination was merely confirmatory. The remaining group of 7 cases of proved cancer, though small, is very interesting, and represents either early or latent cancer. Many cases of cancer are called latent in general practice because no thorough examination of the stomach is made. When examination is made, they are readily discovered. There is another group which are truly latent, the cases which remain hidden or very doubtful even after careful clinical examination of the stomach, and which may be first demonstrated clearly by the Roentgen Ray.

The authors state that the direct demonstration of the cancer itself is of far more value than indirect evidence such as motility and residue.

The most important evidence is a constant defect in the outline of the stomach on filling it with bismuth. In the very earliest cases this is due to a slight local thickening, with disturbed peristalsis, and hard or impossible to recognize as cancer. In later cases the defect is irregular in outline, and of any size, and looks like a jagged bite out of the stomach shadow. It may be annular at the pylorus and extending upward, making the stomach funnel-shaped, with a long narrow canal. The shadow may have a worm-eaten appearance. There is usually rigidity of the wall and local absence of peristalsis.

Cirrhous growth may thicken the wall without projecting into it, making a "leather-bottle" stomach, with little or no peristalsis and high position in the abdomen.

The stomach usually emptied rapidly in the latent cases. This is usually due to the relaxed pylorus found with low secretion, or occasionally to a rigid open pylorus, involved in cancer.

If the pylorus is obstructed, the stomach empties slowly. Such cases may be confused with ulcer or adhesions about the pylorus. In some small cancers at the pylorus which cause early obstruction, the obstruction may be marked and the deformity slight.

The malignant degeneration of an old ulcer may present great difficulty in diagnosis. Slight or marked irregularity in outline favors cancer, but is not distinctive. To put this more in detail, we may say that the chronic ulcer is often definite, the transition stage from ulcer to cancer usually indefinite and impossible to diagnose, the later cancerous stage usually definite and characteristic.

At the cardia the character of the shadow frequently does not distinguish cancer from other causes of obstruction. We may say, in general, that the technical evidence of cancer is *absolutely characteristic* in only part of the cases. In the majority, it must be judged in connection with other clinical data.

The authors summarize their experience in searching for early cancer as follows:

One of the greatest difficulties has been in *getting the patient early*. The first examination when positive has usually discovered well-developed, not early, cancer. Our Roentgen Ray evidence of early cancer is very scanty, but we believe the method will occasionally aid in its discovery and should be given a trial in every suspected case. The better the Roentgen Ray technic, and the more thoroughly the case is studied, the better the chance for an early diagnosis. Well-marked cancers are easily found with fluoroscopic examination and a few routine plates. This is not true of early cases.

In six latent cases, the diagnosis was verified by operation. The patients were all of middle age or beyond; the symptoms were either vague and apparently due to age, arteriosclerosis or syphilis, or pointed to the bowel or gall-bladder, when actually the stomach was involved. In other cases the diagnosis of ulcer was made, and in others gastric catarrh or achylia. Prompt emptying of the stomach was the rule. The gastric secretion was either within normal limits, or, if low, was attributed to functional disturbance, age, or catarrh. Blood was either absent (in one or two cases), or not considered significant of cancer, being laid to slight abrasion of the stomach by the tube, to piles, ulcer, syphilis, etc. No tumor was felt.

Case Called Senile or Functional. The authors have one example of this class where the vague symptoms and loss of weight seem to be well explained by the process of growing old, and the absence of gastric stasis (where the pylorus is not involved), and the lack of significant bleeding wake little suspicion of cancer. Low gastric secretion is considered functional and due to increasing age. The presence of some other lesion, like interstitial change in the kidney, is doubly misleading, and seems to account for the symptoms. The cancer was readily discovered and located with the aid of the Roentgen Ray on the lesser curvature, not obstructing the pylorus.

Case Called Catarrh of the Stomach. When chronic gastric catarrh is present, even though the patient is carefully studied and followed for years, the final development of cancer may come so quietly as to escape observation. The gastric secretion has long been so low that cancer does not lower it. There may be no twelve-hour stasis. The blood test may not be significant. In this case the passage of a stomach tube had often provoked a tiny streak of blood and the patient had piles.

Case Called Syphilis. The Roentgen Ray evidence in this case was definite and clear, but sometimes it is not. Syphilis sometimes resembles cancer too closely to be distinguished.

After Roentgen Ray examination, White and Leonard have two such syphilitic patients, both of cancer age, classed among the "doubtful cases." (One proved to have cancer also, the other was diagnosed as syphilis at operation, and subsequent history for a year confirms it.)

The Roentgen Ray usually helps the diagnosis between cancer and ulcer, and in advanced cases will clearly distinguish. In a large number of the cancer cases, however, it will *not* differentiate between old ulcer and the malignant degeneration of old ulcer (see doubtful cases).

Doubtful Cases. The following cases illustrate the limitations in Roentgen Ray evidence:

In a moderate number of cases (12) the diagnosis remained doubtful after all examination. These were mostly elderly people, all but two were aged 55 to 68. In order of their frequency they were classed as follows: 6 ulcer or cancer; 2 syphilis of stomach or cancer; 2 organic stricture of cardia, nature not determined, probably cancer, in 1 at least; 1 doubtful early cancer

of stomach already referred to; 1 adhesions or cancer. All these cases had some defect or deformity of the stomach, 3 large, 5 moderate, and 4 small. Obstruction of the cardia was present in 2 cases and obstruction of the pylorus was moderate in 8, slight in 2, absent in 2. An absolute diagnosis between indurated ulcer and malignant degeneration of old ulcer is quite often impossible. Half the doubtful cases were of this type. Gastric secretion was practically normal; food stasis and blood were present.

Cases of syphilis sometimes resemble cancer too closely to be distinguished. Our two patients had triple positive Wassermann reactions, and good-sized, irregular tumors in the median part of the stomach. Gastric secretion was very low and no stasis occurred. One at operation was considered syphilis of the stomach, the other cancer.

Cancer of the cardia is difficult in many cases to positively diagnose or rule out. The cardia is less accessible than the pylorus, cannot be manipulated, changes in peristalsis noted, etc., and the contour of the lesion is less clear than at the pylorus. Our two strictures proved to be, one cancer, one benign.

In one man of 55, it was impossible from history, examination, or Roentgen Ray, to decide between gall-bladder adhesions and early cancer. There was previous history of colic and jaundice, the gastric secretions were a little below normal, there was slight gastric stasis and no blood in gastric contents or feces. A small defect was found, involving pylorus and duodenum. Operation refused.

The authors conclude that in the very large majority of cases of cancer of the stomach at the time when they have presented themselves for our examination, and if the stomach is thoroughly examined for secretion, motility, and bleeding by the usual clinical tests, the Roentgen Ray evidence has merely confirmed the diagnosis already made. These more or less typical cases were passed over as they are outside the scope of the paper.

Roentgen Ray evidence of *early* cancer of the stomach is very scanty; anatomical changes in the wall appear at the time of the early symptoms, but the early anatomical changes are hard to recognize; the earlier the cancer, the less clear the evidence.

The small areas of induration in early primary cases are often not characteristic, and the transition stage in cancer developing on ulcer is very difficult or impossible to distinguish from ulcer. The difficulties may be realized when it is said that the authors have been more often wrong than right in their efforts to diagnose early cancer with the help of the Roentgen Ray. Very rarely (in one or possibly two cases), in this series, an *early* diagnosis has been made. They believe the very small number of these early cases is due in part to the limitations of the method, and in part to the lack of sufficiently early examination.

The most important technical evidence is an irregular defect, with rigid stomach wall. The better the technic, the better the chance for early diagnosis. A few routine plates and fluoroscope examinations may not be enough. It has recently been said that by using a large number of plates, gastric cancer at any stage of development may be as accurately detected as a bone fracture, and also that Roentgen Ray diagnosis, whether positive or negative, is as accurate in gastric cancer as a laparotomy. They do not agree to either statement.

Early examination is necessary for early diagnosis. In order to find *early* cancer, patients must be examined more early and often than is now the rule. The *ideal* seems to be early examination of every patient of cancer age who has digestive disturbance.

While our Roentgen Ray evidence of *early* cancer is very scanty, White and Leonard believe the method will occasionally aid in its detection, and should be given a trial in every suspected case.

It is well recognized that a small group of cancers, probably not over ten per cent, remain latent even when well developed. This group increases in size if the patients are carelessly examined, and shrinks if modern clinical methods are faithfully used. In this small group of latent cases, Roentgen Ray evidence has been valuable in making a clear, definite diagnosis when other signs were doubtful. This has most frequently occurred with cancers in the *median* part of the stomach, in which the stomach emptied rapidly. The most common latent cases were cancers developing on an old ulcer, or anacid cases called senile, catarrh or achylia, or patients with syphilis. It must be admitted that the value of the diagnosis to the patients was limited by the fact that all the latent cases examined by White and Leonard were well developed when discovered, and resection was only possible in one instance.

Roentgen Ray evidence has been valuable in helping to rule out cancer in a long list of suspicious cases. In no case where a *normal picture* of the stomach was found has cancer been proved to exist. In the authors' whole group of cases they might say that either *no cancer* or *well developed cancer* was usually found. They believe this occurred because most cases did not come for examination in the "incubation" period.

Roentgen Ray evidence has its limitations. After all examinations a doubtful group remained, about twice as large as the group of latent cases discovered. These were cases of disease at the cardia, or where the diagnosis lay between cancer and ulcer or syphilis.

A few mistakes were made in their anxiety to make an early diagnosis in suspicious cases; they overstepped the mark three times and diagnosed cancer where it was absent. The limitations of the method must be recognized, and occasionally the diagnosis left doubtful, and the patient explored.

In spite of these limitations and errors, the Roentgen Ray evidence had distinctly improved the diagnosis. In 34 operated cases, the correct diagnosis before Roentgen Ray examination was 83 per cent; after Roentgen Ray, 89 per cent. It is almost needless to say that the authors have studied the Roentgen Ray findings in connection with the other clinical data, and have not attempted to build a diagnosis on Roentgen Ray data alone. This addition of the Roentgen Ray method to the other examinations gives an accuracy and completeness to the diagnosis impossible with either alone.

In addition to aiding in diagnosis, the Roentgen Ray evidence has definitely located the cancer, shown its size and extent, and helped decide about operability. It may show that a cancer with marked symptoms is small and mobile, and ideal for operation.

In short, the Roentgen Ray evidence has been a help in discovering and localizing latent cancer, and an equal help in ruling out cancer. The authors' known mistakes have been few, and the group of doubtful cases rather small, and it seems reasonable to expect, with better technic and greater experience, that less mistakes will occur and less cases remain doubtful, and with more early and frequent Roentgen Ray examination of patients of cancer age, that early diagnosis will be more frequently made, and latent cases discovered earlier, so that radical operation will be possible.

Schiffmann, J.: Changes in the ovary resulting from radium and mesothorium radiation. (Congress of German Roentgen Society at Berlin.)

Radium was sewn into a pocket of peritoneum in the neighborhood of one ovary before killing the guinea pig. Two of these were pregnant. The affected ovaries were smaller, and the surfaces were smooth, there being no bulging of the follicles.

The germinal epithelium was unchanged. The follicles and ova were most affected, especially the riper follicles. These had undergone a cystic change. The cells of the membrana granulosa were either swollen, or had proliferated to fill the follicle. Their nuclei were degenerated. Of the interstitial cells, some were normal, others showed degenerative changes in the nuclei with changes in the staining properties.

Four experiments were carried out.

Gauss, Karl, Freiburg, Germany: The treatment of fibromyomata of the uterus. (British Medical Journal, Sept. 26, 1914, p. 531.)

A statistical summary of all the cases of myoma and metropathy treated by raytherapy, of which reports had been published prior to January 1, 1914, is very instructive. The cases fell into three groups according to the strength of the dose of radiation employed. The first group embraces a total of 693 cases, in which total doses of 50 to 175 of Kienboeck's X-units were applied. The second group includes 544 cases, the dose being from 175 to 500 X-units. Finally Group III includes 158 patients, who were given doses amounting to from 500 to 1,500 X-units. Corresponding to the rise of the total doses in the three groups, there is a rise also in the percentage of cures from 72 to 82 and 95. It can be seen from this that the success attained is greater in proportion to the dose of radiation applied to the surface of the body. The difference does not, however, lie only in the size of the dose employed. There was a difference also in the quality of the rays employed in the three groups. Corresponding to the various stages of the gradual development of the methods, Group I consists almost entirely of cases treated either without a filter or with very thin filters—that is, with very soft rays. Filters were used in all the cases of Group II, but they were not so thick as those employed in Group III.

Moreover, in addition to these differences, the class of patients treated was entirely different in each group. Thus, Group I consists almost entirely of cases which, in consequence of the method not being at that time very reliable, were specially selected. Group II represents cases undertaken when advances in technique had somewhat lowered the qualifications demanded for admission to Roentgen treatment; and Group III embraces, as far as can be gathered from the reports, practically all the cases of myoma and metropathy that presented themselves for treatment; at all events, this was the case so far as the Freiburg clinic is concerned. Consequently, the improvement shown in Group III must be due not to the character of the cases, but to improved technique.

Only in Group I were there any deaths—namely, 0.5 per cent—but the records do not attribute them to the method of treatment.

Among the patients in Group II and Group III there were no deaths. This fact alone justifies a claim that all cases of myoma should be treated by radiotherapy, for the lowest mortality ever claimed for operative methods is from three to five per cent. The figures for recurrence appear also to have been continuously reduced by the increase in the doses employed and the improvement in the quality of the rays of which they consist. Whilst in Group I the recurrences work out at 4 per cent, and in Group II at 3 per cent, Group III has no cases of recurrence to record.

The evidence of the table given, compiled from data from a number of different hospitals, and varying greatly in value, is still further corroborated by the experience in the Freiburg Hospital for Diseases of Women.

The 205 cases of myoma and metropathy which had been already reported in detail have been supplemented by another 195 cases, not including any cases still under treatment, which will shortly be reported in detail in a paper by Momm, making a total of 400 cases. The first 205 cases constitute a mass of evidence of very unequal value, as they belong to a time when the methods employed were still in process of development. In the last 195 cases on the contrary, as a consequence of the experience already acquired, an almost unvarying technique had been employed. As this second group of cases fully confirms the good results obtained in the earlier cases, it will probably be admitted that the author is in a position to pass final judgment on the method.

In the case of two women among these last 195, Gauss aimed at producing not amenorrhea, but only oligomenorrhea, and this was obtained. Twenty-four patients ceased to attend before treatment was complete, although nothing calculated to reduce their chances of recovery had taken place. In all the remaining 169 cases the desired metropathy was obtained. As all cases of myoma or metropathy which came to the hospital were treated with Roentgen Rays, with a few exceptions which appeared to be necessary for special reasons, our former assertion that nearly all cases of myoma can be cured by Roentgen Rays finds renewed confirmation.

Gauss' experiences as to permanency of results are equally satisfactory. Of the patients hitherto summoned for supplementary subsequent examination, he has exact knowledge of their state in 174 cases. There was relapse—that is, a recurrence of the menstruation—only in 3 cases, that is, in 1.7 per cent. In all but one of the cases of recurrence the supplementary course of radiation, which is now our routine, was omitted—a mistake we are not likely to repeat.

Gauss marks out on the patient a series of about twelve areas on the abdomen, and about six on the back, each area being 4 to 6 cm. square. With the focus at a distance of 20 cm. from the skin, each of these areas is treated below an aluminum filter 3 mm. thick. The first series of applications of the rays, consisting on an average of about 400 X-units, is followed at an interval of seventeen to twenty days by a second, and so on until the desired amenorrhea is obtained; on an average, this is the case after four series. As a precaution the two so-called supplementary series are then administered at like intervals to prevent recurrences. No injuries have resulted from this technique, which has now been employed by us for years.

Donald, Archibald, M. A., M. D., Edin., Manchester, England: The treatment of fibromyomata of the uterus. (British Medical Journal, September 26, 1914, p. 530.)

Donald is opposed to the Roentgen Ray treatment for uterine fibroids. His objections are stated as follows:

1. All who are engaged in gynecological work know how difficult it sometimes is to be sure that we are dealing with a fibroid and not with some other condition. Mistakes are not uncommon: (a) In cases of pelvic inflammation where hard masses are found inseparable from the uterus; (b) in cases of solid or tense ovarian tumors, especially if they are adherent to the uterus; (c) in cases of ovarian and tubal disease associated with uterine fibroids; (d) in sarcomata and adenomyomata of the uterus, where the diagnosis is only made with certainty after the tumor has been removed; (e) in carcinomata of the uterus associated with a fibroid, or in large cancerous growths in the pelvic cellular tissues; (f) degenerations in fibroid tumors, especially red degeneration and calcareous change. Donald has analyzed 201 of the cases in which he has operated, and finds the following complications were present: Ovarian cyst, 13 cases; red degeneration, 12 cases; suppuration in tube or ovary, 6 cases; appendicitis, 4 cases; calcareous degeneration, 5 cases; fibrocystic tumor of uterus, 2 cases; carcinoma in the fibroid, 2 cases; adenomyoma, 2 cases; necrosed polypus, 1 case; hydroperitoneum, 1 case—that is, he found complications in 44, or in nearly one-fourth of the cases.

2. Sufficient time has not elapsed since the introduction of the Roentgen Ray treatment for fibroids to enable one to state that there will be no further troubles after the hemorrhage has ceased. But, judging from what has happened in many cases after the expectant treatment, there is every reason to believe that many of the tumors which seem for the present to have been successfully treated by Roentgen Rays will cause serious trouble in the future. The later degenerative changes are just as likely, if not more likely, to occur after this treatment as after the expectant treatment. Further, if operation has to be undertaken at a later stage, there is reason to believe that it will be more difficult after Roentgen Ray treatment. The advantages of operative as compared with Roentgen Ray treatment are summed up as follows:

1. The mortality of the operation is now very small—in cases suitable for Roentgen Ray treatment it is under two per cent.

(Three cases are deducted from the nine fatal cases as unsuitable for Roentgen Ray treatment—one case of acute intestinal obstruction, one case of infected fibroid, and one case of large calcareous fibroid where death occurred from peritonitis.) The mortality following Roentgen Ray treatment cannot be estimated for many years.

2. The cases in which operation was most dangerous (cases of profound anemia) a few years ago may now be undertaken with little risk.

3. The patient after operation is at once and for all relieved of any anxiety concerning the tumor.

Donald believes the Roentgen Ray treatment has a place in gynecology in the treatment of cases of chronic metritis associated with profuse hemorrhage at the menopause. But, he says, it should be given up in cases of fibromyomata of the uterus.

Gompertz, Richard, M. D., and Scott, Maitland, M. R. C. S., L. R. C. P., London, England: Use of an aperient before Roentgen Ray examination of the intestine in chronic constipation. (British Medical Journal, Oct. 3, 1914, page 567.)

It does not appear to be certainly known to radiographers whether or not the presence of fecal accumulations in the last portions of the large gut influences the rate of passage of the mixture of bismuth and food in any constant manner.

If there be such an influence, it would seem that the gut should always be emptied by an aperient before a Roentgen Ray examination is made, in order to obtain comparable results in different cases. Some writers advise an aperient, whilst others do not mention it. Gompertz and Scott have endeavored to investigate it.

Four adult men, who had all suffered for many years from chronic constipation, for which there did not appear to be any cause in the nature of mechanical obstruction, were observed, the same procedure being employed in all.

Two series of photographs were taken in each case; the first series was not preceded by an aperient; in the second the bowel was emptied by a dose of castor oil on the night before the bismuth meals. Observations were made immediately at four, six, twelve, twenty-four, thirty-six and forty-eight hours after the bismuth breakfast, and at other times when necessary.

The following is a summary of the findings in the four cases:

1. The first case was one of delay in the stomach and colon. In the first series of skiagrams, before which no purgative was taken, the stomach emptied in about nine hours, and the transverse colon, which was reached in seven hours, not till one hundred hours.

In the second series (after castor oil) the stomach emptied about one hour earlier, but the delay in the colon was not appreciably affected.

2. The second case was one of spastic constipation of the descending colon, the passage through the stomach and small intestine being normal. The stomach was emptied in four and a half hours and the cecum reached in four hours. The stasis in the large bowel was especially marked in the cecum.

On comparing the two series of skiagrams, it was found that the bismuth passed rather more rapidly in the first series than in the second one (after castor oil).

3. In the third case also the delay was in the large intestine, but here we found that the second series (after castor oil) showed a slightly more rapid passage of the bismuth.

4. The fourth case was one of moderate delay in the cecum, but the total time which the bismuth took to traverse the entire bowel was not abnormally long; the cecum was not quite emptied in thirty hours, while the bismuth had entirely left the rectum in forty-eight hours.

In this instance there was practically no difference to be noted between the two series of skiagrams.

So far as the evidence in these cases goes, the conclusion may be drawn that, in cases of chronic constipation, the variations between the rates of passage of the bismuth along the intestine were but small, whether the bowel had been emptied by a preliminary aperient or not; at the most, the differences were not greater than can be said to be within the normal limits.

Further, where differences were noted in the two series, they were not constant, being in one case in the direction of greater rapidity after an aperient, in another of less, and in a third varying at different times in the same patient.

It is, however, undoubtedly wise in most cases to give a purge before making a Roentgen Ray examination, on account, first, of the greater clearness of the skiagrams obtained when the intestine is empty; and, secondly, of the discomfort which the patient, deprived of his usual aids to defecation, may experience in the two or three days occupied by the Roentgen Ray observations, during which, of course, no aperient must be given.

The result of these trials appears to show, nevertheless, that in cases in which time does not permit of a preliminary purge, or in which it is undesirable for any other reason to give it, the conclusions reached may be accepted without the fear that they have been materially vitiated by the omission.

Lockyer, Cuthbert, M. D., F. R. C. P., F. R. C. S.: The future of Roentgenology in gynecological practice. (Journal of Obstetrics and Gynecology, August, 1914, p. 92.)

In searching for statistics of the results of treatment as applied to fibroid tumors, Lockyer was surprised to find that nearly every reference indexed as "Myome" during the past seventeen months in the *Zentralblatt f. d. g. Gynaekologie u. Geburts.* related to radiotherapy. The following are a few illustrations:

1. Prochownick *(Fortsch. a. d. Geburts. und Roentgenstrahl., Bd. 20, H. 3, S. 316.)*

Of 180 myomata, 45 were treated by Roentgen rays according to the Hamburg technique.

The climacteric was complete in 40.

No recrudescence of the growth.

Size diminishes quicker than after castration or after the natural menopause.

2. Ludwig, Mohr, of Hamburg *(ibid, Bd. 20, H. 2, S. 105.)*

796 myomata: 127 still under treatment.

669 myomata = 56.2 per cent. "cures," i. e., amenorrhea or the desired oligomenorrhea, with cessation of pain.

= 17 per cent. improved, i. e., oligomenorrhea where amenorrhea was desired.

Taking the results in relation to age:

202 patients with myomata—

Age 30–40 = 46.4 per cent. "cures."

Age 40–50 = 80 per cent. "cures."

Over 50 = 93.8 per cent. "cures."

3. Haenisch, G. Fedor *("Uber die Roentgenbehandlung." Strahlentherap. 2, S. 249.)*

31 cases of myomata and menorrhagia.

24 "healed" for ¼ to 3¼ years.

Reduced in size or total disappearance.

Hemorrhage completely staunched.

(Treatment 50-60 X.)

4. Cheron, H. *(Archiv mens. d'Obstet., 2, S. 1-4.)*

193 myomata treated by combined Roentgen rays and radium.

"No misfortune."

5. Haendley, Paul *(Strahlentherap., 2, S. 227.)*

80 myomata = 68 amenorrhea.
= 6 oligomenorrhea.
= 6 no result.
= Reduction in size in one-third of cases; size at first varied from that of a fist up to that of a five months' pregnancy.

6. Runge, E. *(15 Versam. d. dtsch. Gesell. f. Geb., Halle, May, 1913.)*

90 myomata.

86 amenorrhea, 4 operated upon.

40 per cent. shrinkage in size.

Döderlein, at the meeting at Halle, May, 1913, referred to Krönig and Menge as having obtained 100 per cent. "cures" with the Krönig-Gauss intensive treatment up to

3000 X, as used in Freiburg; whilst Albers Schönberg speaks of 75 per cent. as the result of the mild method up to 50 X adopted in Hamburg. Gauss reports that of 30 cases of carcinoma uteri treated by mesothorium, 10 are "cured." Lockyer has seen a paravaginal recurrence, the size of a walnut, completely disappear after contact with a radium capsule for thirty hours (dose 100 milligrammes), and in another case of carcinoma of the body in conjunction with fibromyoma, there is marked shrinkage and cessation of foul discharge after twenty-four hours' treatment with the same dose encapsuled in lead 2 mm. thick. Taking the duration of treatment by mesothorium in relation to *age:* To obtain complete amenorrhea in myomata and "metropathic" cases, Gauss and Krinski give the following:

Average number of series 2.6 for amenorrhage in myomata and 2.3 for metropathies (? metritis, etc.):

35-40 years = 8 weeks' treatment.
41-50 years = 7 weeks' treatment.
50 years = 6 weeks' treatment.
Time: Myomata, 176.5 hours.
Metropathies, 175.8 hours.

In the Freiburg Clinic, Gauss employed an aluminum filter of 3-4 mm. thickness, and increased the charge of the tube up to 5-10 milliamperes, and made it his object to apply *large doses in as short a time as possible.* For this purpose, he made use of the French cross-fire system, and marked off a large number of special fields on the body of the patient, some thirty to fifty triangles of six sq. centimeters being mapped out in the abdomen and back. The Roentgen rays are introduced through some of these fields, whilst the remaining areas are covered. Gauss found he could introduce a double or triple dose of filtered hard ultra-penetrating gamma rays without burning the skin.

To measure the dose, a photographic unit is taken; the unit adopted on the Continent is the X unit of Kienboeck, which is half the Holzknecht unit, or tint B. Sabouraud-Noire, i. e., 10 X 5 H. Gauss has found it necessary in certain cases to use as high a dose as 3,000 X = 1,500 H. to one patient in a series of radiations.

The necessary dose cannot be given in one series, because two menstrual periods intervene before the series of sittings is completed, i. e., eight weeks or more are required for this purpose. Gauss estimates that for myoma cases the average time needed to produce amenorrhea and the disappearance or marked shrinkage of the tumor is about eight weeks, and that the total dose is 1,800 X.

The therapeutic effect of all the tested radio-active bodies—Roentgen rays, radium, mesothorium—seems to vary directly with the intensity of its application, and inversely to the duration of time over which the application has been spread, so that in the words of Gauss, "In the case of a large dose applied for a short time, healing sets in quickly, whereas the same dose extended over a long period tends, on the contrary, to aggravate the symptoms of the disease." Lockyer thinks it is sometimes preferable to combine the effects of Roentgen rays with those of radium or mesothorium for myomata. The radio-activity of the two latter bodies is said to be similar in every important detail, but it differs from Roentgen rays in that while the Roentgen rays are only projected forward, the rays from radium and mesothorium are distributed in all directions, radium also gives off a proportionately large number of hard gamma rays, and therefore possesses much greater penetrating power than Roentgen rays.

Dominici, by using strong metal filters, has succeeded in cutting off the soft alpha and beta rays, allowing thereby of the isolation of the gamma rays for therapeutic purposes. The filter is composed of strong metal—lead; and the radium or mesothorium is introduced inside a capsule of this substance. The capsule is placed either in the vaginal vault or within the uterus itself.

The question of safe dosage was the result of much experimentation; it varies with the kind of filter or capsule which is used, and must therefore be determined for each capsule, especially since the radio-activity of different samples of radium and mesothorium is liable to great variations. Tests on plants and animals are accordingly made in order to obtain the measurement of activity of each tube, e. g., a mouse shut up in a lead box 4 mm. thick was killed in twenty-four hours. It has been found safe to use as much as 400 to 800 mg. of mesothorium over a period of from 70 to 200 hours (Gauss). The dose employed for myomata in the Freiburg Clinic is 50 mg. of mesothorium in a strong metal capsule. It is introduced into the uterus, cervix or vagina, and left until the mesothorium reaction is obtained, i. e., a blue coloring of the vaginal mucous membrane, and repeated at the end of three weeks. Gauss says: "By the use of this method, two or three sittings have sufficed *to cure all cases* up to the present; that is to say, they have brought about shrinkage or disappearance of the myomatous tumor and cessation of menstruation irrespective of the patient's age, or of the size of the tumor, or of the degree of anemia." In view of such success, the use of Roentgen rays is only retained as a policy of economy. Mesothorium, being much cheaper to buy than radium, is much more frequently used; but its half-value time is only 5.5 years, as compared with that of radium, which is 1750 years. As long as it lasts, however, its therapeutic value appears equal to that of radium.

1. Ovaries

Claude Regaud and Ant. Lacassagne, by experiments on rabbits, found that the radio-sensibility begins with the growth of the follicles and reaches its maximum with full follicular maturity. After rupture, i. e., during the development of the corpus luteum, radio-sensibility decreases rapidly, and old follicles are completely unaltered.

Gauss and Krinski have noted the follicles to be markedly affected by mesothorium and Thor. X., and are not decided whether this is the result of the biological action of the rays, or due to indirect chemical changes in the cells.

Albers Schönberg mentions experiments on animals, which prove a decrease in number and disappearance of follicles—degeneration of primordial follicles, and states that the same has been observed in human ovaries. He regards the reduction in size of a growth as primarily due to ovarian sclerosis, but also the effect of the Roentgen rays on the tumor cells.

Alexander Lorey says there are changes in the follicle epithelium and in ova, even to complete destruction later on; the same occurs in the stroma, the ovaries diminish in size, and are rendered functionless.

Calatayud refers to atrophy of the ovaries together with shrinkage of the tumor, and says the blood supply to the tumor and uterus is diminished as a result of loss of ovarian function.

Fedor Haenisch attributes the results of the rays to injury to the ovaries and also to direct action on the tumor.

P. Meyer is of the same opinion, saying that Roentgen rays act indirectly on myoma via the ovaries, and also have a simultaneous action on the tumor.

Cl. Regaud, mentioned above, describes the results of experiments on seven guinea pigs, and three bitches. Of the seven guinea pigs, three were proved fertile after six, nine and ten months' treatment by rays. Four remained sterile; the ovaries of the sterile pigs were examined fifteen to twenty months later, and were found to contain only a few abnormal follicles. The ovaries of bitches lie deeper and are more mobile, hence difficult to localize; so that, in spite of using rays so strong that the three bitches died of bowel injuries, the ovaries still contained innumerable living follicles, though some were destroyed. Regaud adds that in the human subject the ovaries are mobile and still deeper, so that it is impossible to sterilize them with rays directed only from before back. The published cases of "Roentgen sterility" are, in his opinion, cases where the ovaries were sterile to start with, or are so as a coincidence.

(2) The Tumor and Other Tissues

Calatayud says the rays have a direct influence on the tumor in the shape of nuclear necrosis. The uterine mucosa becomes sclerotic and the endothelium of the vessels atrophic.

Haenisch speaks of a direct action on myomata, but places this quite secondary to the action on the ovaries.

Krönig and Gauss report that the shrinkage of a myoma in size does not occur with radium and mesothorium as it does with Roentgen rays, and therefore for large myomata the latter are preferable. "Radium probably acts on the uterine mucosa and on the ovaries, and its action is principally hemostatic."

Albers Schönberg acknowledges the direct action of rays on the tumor cells.

Lars Edling regards the cessation of hemorrhage with the application of radium as due to mucosal changes, and the shrinkage in size as due to the disappearance of edema and not to degeneration of muscle cells in the tumor.

Jenkins states that a direct influence on the uterine wall or myoma, such as probably takes place with Roentgen rays, has not been proved for mesothorium, so that when he wishes to influence the activity of the ovaries by mesothorium he prefers to place the tube in the vaginal vault.

Adler, of Vienna, states that mesothorium causes necrosis of tumors, and he has found vacuolation of protoplasm, syncytial fusion of cells, disappearance of nuclei and very irregular nuclei rich in chromatin. Also thickening of vessel walls, and wandering of eosinophile leucocytes, and the formation of granulation tissue in cancers.

Aschoff found extensive cell destruction, especially in the spleen of a mouse which was killed in 24 hours by placing the animal in a leaden box, 4 mm. thick, outside which was placed 800 mg. mesothorium.

Chilaiditi finds that the (therapeutic) energy of the Roentgen rays varies with the thickness of the abdominal walls, the mobility of the skin, the size of the abdomen, the size of the tumor, and the age of the patient.

Krönig and Gauss draw attention to the special behavior of radium and mesothorium, and they say great caution is necessary, since there is a great variability in the activity of different samples of these bodies, and they have also noted that different patients react in different ways to one and the same "stream." The rapidity of the action of radium as compared with that of Roentgen ray is commented upon. They have found that with radium the effect shows itself sometimes after the first dose, whereas with Roentgen rays six doses or more are necessary to produce the same result. They speak very favorably of the combined use of radium and Roentgen rays.

BOOK REVIEWS

Electricity in Diseases of the Eye, Ear, Nose and Throat. By W. Franklin Coleman, M. D., M. R. C. S., Eng., Ex-President of and Professor of Ophthalmology in the Post-Graduate Medical School of Chicago; Ex-President of the Ophthalmological Society of Chicago; Professor of Ophthalmology in the Illinois School of Electro-Therapeutics, Chicago, etc. Cloth. Pp. 595, with illustrations. The Courier-Herald Press, 1912.

The book contains a review of the physics of electricity as applied in medicine and this is given in a clear, concise manner. The author then reviews the general results to be expected in the treatment of the eye, ear, nose and throat, with a general description of the technic, and in this the author has made himself quite clear and has given some valuable information. There is then a general review of the technic used and the results to be expected in the treatment of individual diseases with the reports of a large number of cases.

As a whole the book deserves a place in the library of every electro-therapeutist and in the library of those who are using electricity in the treatment of diseases of the eye, ear, nose and throat. The most satisfying part of the book is the description of his own individual work and results rather than his quotations from literature.

ITEMS OF INTEREST

A joint meeting of the New York Roentgen Society and the Philadelphia Roentgen Ray Society was held at the Hotel Adelphia, in Philadelphia, Saturday evening, November 7th. There were present thirty-four members and invited guests; among the latter being Dr. Gray of Richmond, and Dr. Selby of Washington.

Mr. Edwin Kelly of Philadelphia read a paper upon the hydrogen X-ray tube, after which an interesting demonstration of this tube, in both the ordinary and the air-cooled types, was given. This paper will appear in a later issue of this journal.

Professor Shearer, of Cornell University, read a paper upon some measurements made with the Coolidge Tube. Lantern slides were shown by Dr. Law, showing a clot in the lateral sinus. Dr. LeWald exhibited some interesting gastro intestinal slides and Dr. William H. Stewart some slides of head injuries.

At the dinner after the meeting the project of a mid-winter meeting of Roentgenologists, to be held in Atlantic City, was brought forward and unanimously adopted.

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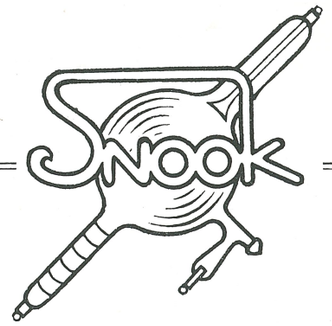

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